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ST ENGINEERING
RARY

June 5, 1950

STEEL

The Magazine of Metalworking and Metalproducing

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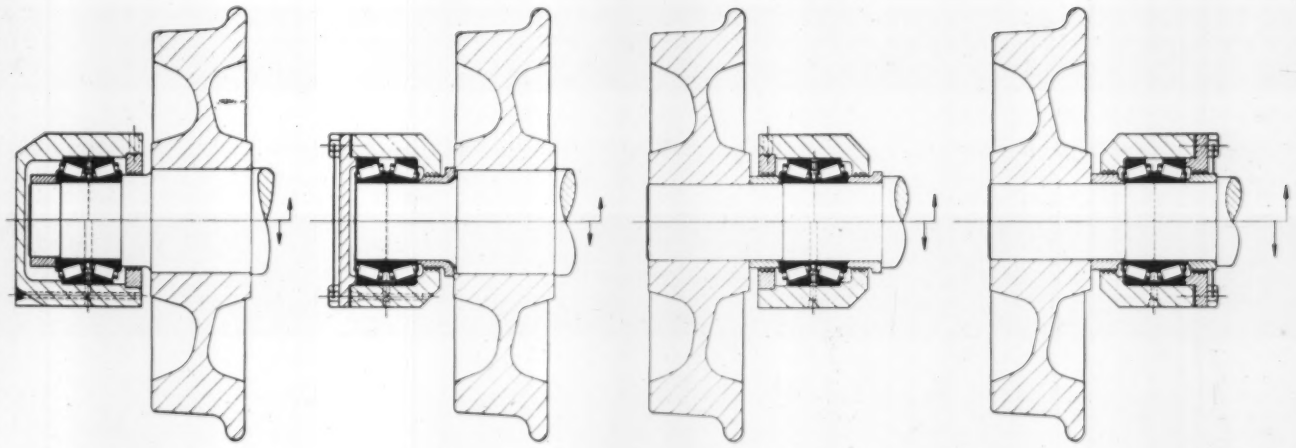
Four ways to cut ingot car maintenance costs...with TIMKEN® bearings



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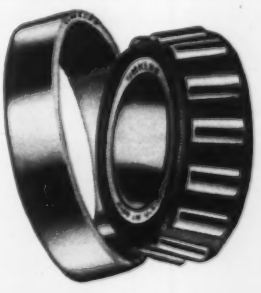

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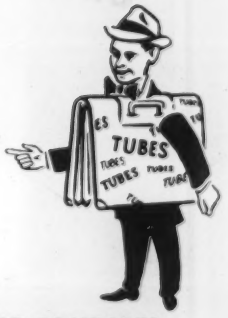

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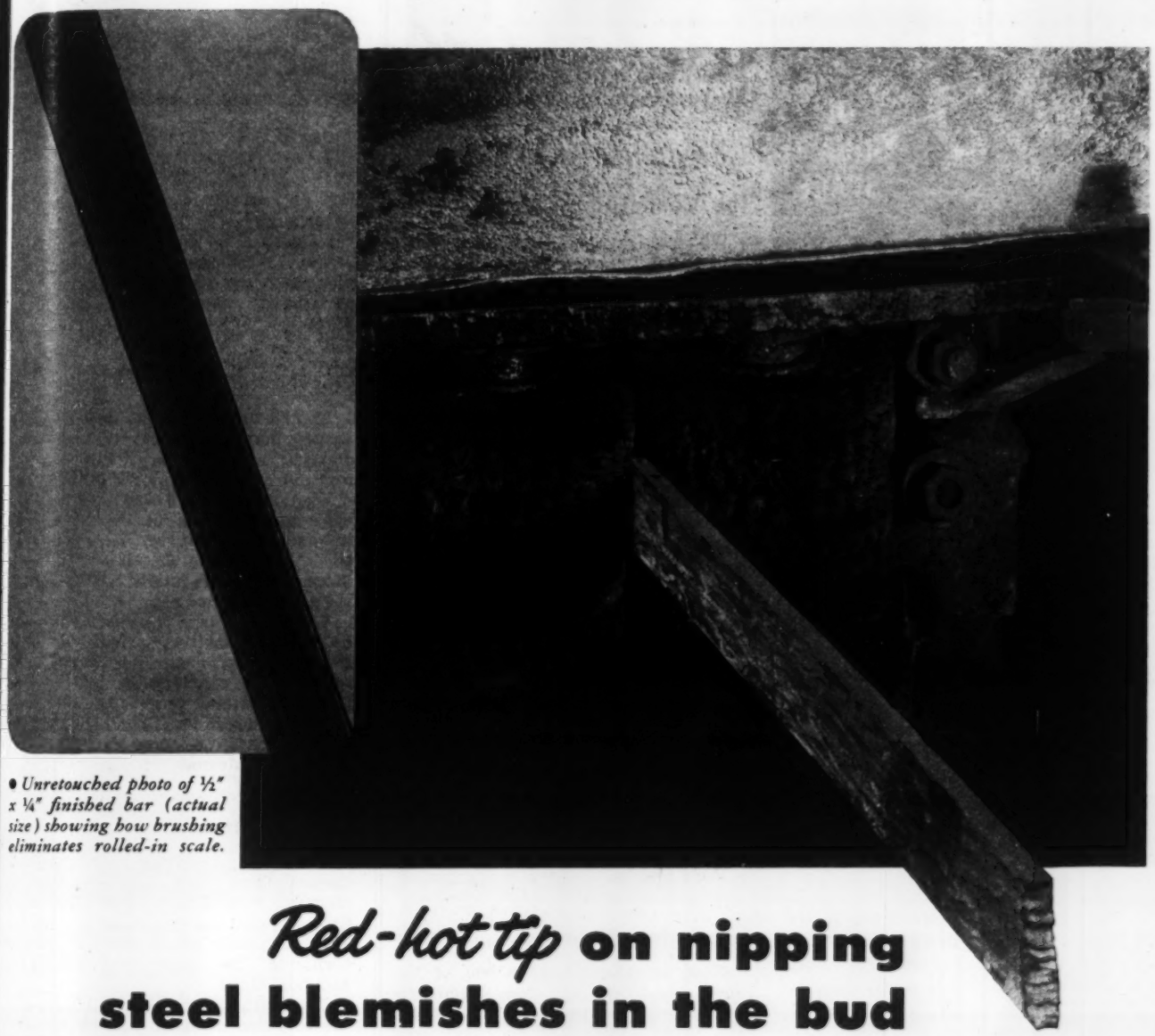

• *Unretouched photo of ½" x ¼" finished bar (actual size) showing how brushing eliminates rolled-in scale.*

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Behind the Scenes . . .

The Continental Touch

We had no idea that we would be treated to an American business luncheon with European *savoir faire* when we went to meet Hughes Wasserman, the president of Societe des Soudures Castolin, Lucerne, Switzerland. He was the guest of honor at a lunch given in New York by his son, R. D. Wasserman, president of Eutectic Welding Alloys Corp.

The elder Mr. Wasserman looks more like a foreign diplomat than a pioneer in welding whose association with the industry dates back to the late 1890s. As we were introduced to the gentleman, he bowed from the waist, his striped trousers beautifully creased, his morning coat immaculate, his boutonniere fresh and gay. We imagine he is about 4 feet 5 or 6 inches tall, but his attire and a Van Dyke beard make him seem taller. Nor does he look his 76 years of age.

A five-piece orchestra played intermittently. In addition to cocktails, wine was served with the meal, and the whole affair proceeded leisurely.

"Stop in and see me the next time you're in Switzerland," Mr. Wasserman told us.

We'd like to.

Lakefaring Bible

Now off the press is one of the more important but less frequently issued of the Penton publications. The *Great Lakes Red Book* has been for years the bible of lakefaring men. It is a directory of over 1500 vessels plying the Great Lakes. The 1950 edition puts in the palm of your hand (the book measures 3-1/16 by 4¾ inches) a list of the owners, captains and engineers of these ships and gives all other data of importance to the marine trade.

Although we can get violently seasick in a rowboat on Lake Erie, we still enjoy the romance of the Lakes via the *Red Book*, revelling in ship names like the *General Orlando M. Poe, David Z. Norton, Samuel F. B. Morse* and *Hilda* (a barge, poor girl).

Five Hundred Years Too Late

Art Editor Don Cadot has trouble with both the spelling and pronunciation of his name (it's pronounced kaydough). A new high in the spelling end came when he received a letter addressed to John Cabot. Don reports that he was not born in 1450, never did too much geographical exploring, never worked for Henry VII and never had a ship called the *Mathew*. "I prefer canoes," he says.

Our Natal Day

"You'll find us a combination safety valve, mail bag, private detective, dopester and perhaps in our own inimitable way—a humorist."

Well, well. That's what we said we were going to be in this sector of the magazine just 15 years ago this week. Yes, June 10, 1935, fell on a Monday a decade and a half ago when we first burst into print.

We figure this is the 780th time you have been subjected to the peregrinations of these paragraphs. We believe we've made considerable progress in the past fifteen years. In 1935 our deathless prose was set in little 6 point type. We come out big and bold in 8 point now.

Puzzle Corner

Herman Albertine of Adams Grease Gun Corp. and Charles E. Norton of Highland Park, Ill., were first in with correct answers to the May 22 puzzle about the ball in the corner of the room. The ceiling is 11.2 feet high.

Four pirates located a buried treasure of pieces of eight, just at twilight, and decided to wait until daylight to divide it. To make sure of getting his portion, the first pirate got up in the night, counted the treasure into four equal piles. Having one piece left over, he threw it into the lagoon. He took one pile and mixed the three others together. Later the second pirate got up, divided the remaining treasure into four equal parts, took one share, threw the one piece left over into the lagoon. The third and fourth pirates each did likewise. In the morning the remaining treasure was divided into four equal piles and there was one piece left over. How many pieces were there originally?

Shrdlu

(Editorial Index—page 55)

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STEEL

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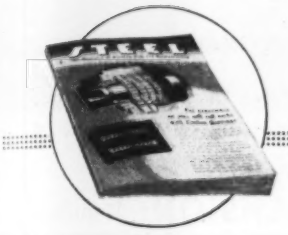

June 5, 1950

Pro and Con

Current popular topic of conversation among industrial executives is the five-year contract signed recently by General Motors Corp. and United Automobile Workers-CIO. There is almost universal agreement that the pact is advantageous to the company and its workers. The greatest differences in opinion arise when the conversation turns to the question of how the GM-UAW agreement will affect labor relations in other segments of industry.

Everybody expects that many features of the GM contract will find their way into the future contracts of hundreds of other companies. If so, two difficulties may arise. One of these stems from the fact that "ability to pay" unquestionably was an important factor in the GM-UAW settlement. It is obvious that many companies are not in a position to agree to provisions as liberal as those granted by GM. To put it another way, some companies would have to increase prices more than other companies in order to meet the additional costs of a package similar to that agreed to by GM.

This line of reasoning leads to another misgiving. That is the fear admitted in some quarters that the 4-cent annual improvement factor is dangerously inflationary. Here again the point is raised that all companies are not on a par in their ability to absorb the increased cost of higher wages, pensions and insurance in increased efficiency and productivity. It is argued that if a substantial number of suppliers of materials and parts to the automobile industry could not absorb the higher costs and were forced to increase prices, an inflationary cycle would develop which conceivably might force the motor car manufacturers to raise the selling price of cars. Additional weight to this reasoning is provided by new evidence from Washington that the Truman administration is definitely set upon further inflationary policies.

Time alone will determine whether or not the concern over "ability to pay" and inflationary aspects of the GM pact is warranted. A possible redeeming factor is that five years of industrial peace would do wonders for the economy. For one thing, the benefits of increasing productivity would become cumulative for the first time since the end of the war. This could be tremendously important.

* * *

ENGINEERING TEAMWORK: Steel Founders' Society of America is pushing a practical research and development program which merits the attention of all manufacturers whose products are particularly subject to competition from similar products made of other materials or by other methods.

The underlying principle in the steel founders' program is that seldom can any structure be considered to be so perfectly designed that improvement is impossible. Recognizing the fact that correct design is of paramount importance, the steel founders approach their problem of expanding the field of steel casting applications by promoting a better understanding among designers and foundry engineers. It is a matter of adjusting the objectives of one to the facilities and techniques of the other.

Restudy of existing designs by this type of engineering teamwork often leads to improvements and enhanced price factors beneficial to both manufacturer and supplier. This is true "whether the aim is to substitute a casting for a weldment; weldment for casting; simply to

(OVER)

improve a basic casting design; or to seek essential improvements via redesign of a forging, bolted or riveted plate structure; or composite fabrication; or possibly redesign of castings for conversion to cast-weld construction."

This realistic development work is rewarding steel foundries with a larger and more satisfactory market. The same pattern of systematic effort will reward any group which has a meritorious product. —p. 92

* * *

REMOVE JOB BARRIERS: Advocates of a common economic policy for the heavy industries of France and Germany are hopeful that their plan will have a beneficial effect upon the European labor market. They point out that the Scandinavian countries already have proved the advantage of a more flexible interchange of job seekers.

In 1946 Sweden and Denmark entered into an agreement whereby both nations removed virtually all barriers for their citizens seeking jobs in either country. Labor exchange offices were set up to assist unemployed. A few months ago the plan was extended to include Norway and Finland. As a result job opportunities in an area having a combined population of 18 million are open to job seekers from any of the four participating states. As of January, 1950, about 48,000 Danes, Norwegians, Finns and Icelanders were working in Sweden.

It is easy to believe that if a similar removal of barriers were effected throughout all of Europe, the advantages would far outweigh the disadvantages. —p. 67

* * *

WIDER PLATES, SHEETS: The new rolling mill installation of the Aluminum Corp. of America at Davenport, Iowa, is outstanding in at least four respects. First, its 144-inch hot mill can roll plates up to 140 inches wide and its 100-inch continuous mill can roll sheets up to 90 inches wide. These widths exceed those previously available and make possible new applications of aluminum.

Second, plant and equipment at Davenport were laid out with a view to easy expansion of capacity. In case of emergency, capacity could be doubled in three or four months, with priorities. Third, the plant is a model in good industrial housekeeping. Fourth, its construction involves a number of interesting new architectural applications of aluminum.

At present the new mills are operating at about 80 per cent of their monthly capacity of 15 million pounds. Shortage of pig aluminum, not orders, is the factor limiting output. —p. 74

* * *

BOOTSTRAP EXPANSION: Republic Steel Corp. announces expansion of facilities in Cleveland which will increase annual capacity of steel ingots 182,000 tons and of cold rolled sheets 137,000 tons. Most unusual phase of the project is revamping of materials handling equipment and increasing the structural strength of the open-hearth building so that heats tapped in each of the 15 open-hearth furnaces in the Corrigan-McKinney plant can be increased from 200 to 220 tons.

Decision to increase the take from existing furnaces instead of building new units probably is prompted by a number of developments in recent years which indicate that existing open hearths could yield more steel if charging and tapping operations were speeded up. It will be interesting to compare the results and cost of the Republic undertaking with those of the orthodox method of building new furnaces and new handling equipment. Success of the Republic plan would provide steelmakers with an alternative means of stepping up capacity. —p. 65

* * *

CROSS-BRED MACHINES: Guy Hubbard admits difficulty in determining where "the machine tool ends and something else begins" in certain new mass production installations. He thinks "we may be entering an era of cross-bred machines—part machine tool, part material handling mechanism, part gaging apparatus and part assembly device. Some of the cross-bred machines involve even strains of heat treating equipment—as in the case of automatics which induction harden set screws."

Certainly the tendency to co-ordinate an increasing number of handling, gaging, testing, heating and other operations with the machining function is increasingly apparent in many shops throughout the nation. Naturally it is more pronounced in mass production, but one finds instances where such co-ordination is being applied to work in job shops.

Perhaps what we are witnessing is the result of closer co-operation between machine tool manufacturers, tool engineers, production managers and others—all under pressure to lower the cost of manufacture. —p. 97

E. L. Shaner

EDITOR-IN-CHIEF

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News Summary

MORE INFLATION?—Watch out for rising prices (p. 63). These are a few of the signs that indicate another round of price boosts may be imminent: The government's wholesale and cost-of-living price indexes are inching upward; small steel producers have raised some prices; steelmaking scrap prices have jumped 36 per cent in the last ten weeks; the nonferrous metal price composite has risen for the past eight weeks; the General Motors labor settlement has inflationary aspects; capital goods makers are unhappy about profitless prosperity.

BUSTING OUT ALL OVER—Industrial production soars higher and higher (pp. 80-83). STEEL's index hit a preliminary 209 for the week ended May 27, a four-point jump from the previous record set the week before. Steelmaking operations continue well above 100 per cent of capacity. May output probably achieved a new high of over 8.5 million tons. The Federal Reserve Board index reached 189 in April, two points above the March level. Household appliance makers' volume for the first half will be well above the 1949 pace. But records to end all records are being set by automakers (p. 77). Their production in the first five months was 20 per cent over 1949. First half output may reach 3.7 million units.

PHOTOFINISH—The CIO's new IUE squeaked through to a victory over the rival leftish UE in a fight for representation at 57 General Electric Co. plants (p. 64). The unofficial score shows: The IUE won 49 local units representing 53,971 employees; the UE won 40 local units representing 36,703 employees. The UE won two of ten largest local units at stake; the IUE won the other eight.

HEAD START—Expect good export business for the fiscal year beginning next July 1 because Congress will probably approve about $3.2 billion for the ECA (p. 70). Foreign aid brings a lot of business that the U. S. ordinarily wouldn't get. In 1949 exports came to $12 billion; ECA countries took $4 billion of it.

LEBENSRAUM— Fritz Schmidt, German counterpart of the American worker, Joe Doakes, may be pleased as punch about an offshoot of the French-German economic union scheme: It may revive a free labor market (p. 67). If German or French workers are out of work today, they can take a job in some other country only if they extricate themselves from a tangle of red tape. A free labor market is shaping up in Scandinavia that could be a model for a free French-German labor market.

WHAT'S COOKING?—Order backlogs of companies producing refrigerators, mixers, washers, serving tables and other kitchen appurtenances for the food equipment industry are beginning to bulge (p. 68). Companies making commercial food equipment do business with over half a million restaurants, school cafeterias, roadside stands, etc. that do better than a $10 billion annual volume.

DOWN IN THE CORNFIELD—Aluminum Co. of America's aluminum sheet and plate mill (p. 74-75) is the world's largest. Alcoa's officials, when they conceived the idea for it, planned expansible features. By adding only another hot mill and new melting hearths in spaces already provided, they can double the 15-million-pound monthly capacity. The new plant is out in Davenport, Iowa, where the tall corn grows.

HERE AND THERE IN INDUSTRY—Republic will boost its ingot capacity in Cleveland by 11 per cent (p. 65); the increase will all go into cold-rolled sheets . . . Carnegie-Illinois is adding two new coke batteries of 87 ovens each that will cost about $9 million (p. 65) . . . Standard Steel Spring will put two more plants in operation this fall for the manufacture of seat and back cushion springs (p. 65); one plant will be in Los Angeles, the other in Roebling, N. J. . . . The nation's blast furnaces turned out 5,577,020 tons of pig iron, ferromanganese and spiegeleisen in April—the highest production since March, 1949 (p. 66).

Production-Engineering News—p. 91 *Market Summary—p. 149*

cut operating costs, increase payloads —reduce weight or increase strength

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These properties permit three different approaches to the problems of design and construction:

1. To design for same strength with reduced weight and greater payloads;
2. To design for greater strength with same weight and payload; and
3. To design for compromises that will allow variations of these qualities.

In each case operating costs of mobile equipment are greatly reduced.

And Inland HI-STEEL can be worked either hot or cold—punched, drawn or otherwise fabricated—welded or riveted—with little or no change in shop practice.

COMPARISON OF *AVERAGE* PROPERTIES OF HI-STEEL WITH ORDINARY STRUCTURAL GRADE CARBON STEEL

Tensile Properties (¼" Plate)	Inland HI-STEEL	Ordinary Structural Grade Carbon Steel
Yield Point (psi)	56,000	35,000
Ultimate Strength (psi)	73,000	66,000
Elong. in 8" (%)	25	25
Endurance Limit		
Fatigue Strength (psi)	49,000	33,000
Impact Resistance (Charpy Impact—ft. lbs.) Temperature		
80° F	55	36
32° F	43	33
0° F	36	26
—25° F	34	6
—50° F	30	2

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STEEL
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Pressure Rises for Higher Prices

Most companies have held the line for the past six months or a year, but they're running out of ways to completely offset rising costs, chiefly in labor

PLAYING hide-and-seek with another general price rise? Most metalworking companies have evaded "it" for six months to a year, but they may not be able to hold out much longer.

These signs indicate that industry is running out of ways to completely offset rising costs, mostly in labor:

Going Up—The Bureau of Labor Statistics wholesale price index has been rising steadily. For the week ended May 23, the index for all commodities stood at 156.1, 0.1 per cent higher than the week previous, 1.6 per cent higher than four weeks before and 0.1 per cent higher than one year before. The monthly wholesale price index for April, 1950, was 152.9 per cent of the 1926 average—0.1 per cent above the figure for the month before. The consumers' price index of the Bureau of Labor Statistics increased 0.2 per cent from Mar. 15 to Apr. 15 when it reached 167.3. Major factor in this jump was a 0.4 per cent rise in the cost of fuels and electricity. Rising federal deficits don't help in keeping prices down.

Small steel producers—Follansbee Steel Corp., McLouth Steel Corp. and Superior Steel Corp.—have increased some of their prices. Steelmaking scrap has been rising steadily since Mar. 2.

High Scrap—The $37.17 steelmaking composite price for the week ended June 1 is 36 per cent or $9.84 above the level nine weeks before. Although other scattered steel price boosts will come, expect general stability unless scrap prices skyrocket still more. For every advance of $10 a ton in scrap, steelmaking costs go up about $3 or $4 per ton, depending on such variables as the amount of home scrap used and the scrap-pig iron ratio in the open hearths. Improved productivity can perhaps offset part of the rise in scrap and other costs, but that factor can be stretched just so far.

STEEL's nonferrous metal price composite is at 173.9. It has risen for the past eight weeks.

Wet Blanket—As welcome as the General Motors wage settlement is, it has inflationary aspects. The agreement grants expensive pensions and hangs on to the self-feeding, cost-of-living formula. It directly affects 270,000 hourly workers, but indirectly it may affect many thousands more because it can establish a pattern for other companies, particularly automotive. Henry Ford II says auto price cuts are "not in the foreseeable future."

Will Inflation Burst Price Dikes?

Capital goods makers, notably machine tool makers, are grumbling about profitless prosperity because their volume is tremendous but their earnings are slackening. Capital goods prices may rise.

Manufacturers and distributors at the large Triple Mill Supply meeting late last month agreed that higher prices are in the offing.

Look Before They Leap—In tinkering with their prices, manufacturers will move cautiously to prevent throwing the present boom out of whack, but many think they must act soon. Expect scattered price boosts in diverse lines over the coming months.

Economic analysts at the beginning of 1950 were almost unanimous in predicting lower prices for the second half. What happened? Those predictions are thrown out by a triple play—the steel strike, the prolonged coal walkout and the Chrysler strike. The labor fireworks curtailed production enough to start shortages again in steel and automobiles. Shortages breed higher prices.

Sears Cuts Prices

Sears, Roebuck & Co. is not playing games with higher prices. Last week the company announced price cuts averaging 7 per cent on 4000 items that were reduced for a sale lasting till Aug. 15.

Counter to the firm or rising pressure for higher prices felt in the market generally, these price cuts appeared in the company's midsummer catalog:

Refrigerators, 8.5 cubic feet in capacity, were reduced 12 per cent.

Housewares were down 11 per cent.

Aluminum garage doors were cut 12 per cent.

Battery radios were slashed 17 per cent.

A long list of plumbing supplies, dinette sets and other hard and soft goods is marked down. The range of reductions on soft goods is somewhat wider than that on hard goods, but the markdowns on hard goods are more significant because of the steady preference by consumers for hard goods this year.

Industrial Layoffs Decline

Industrial layoffs were at an 18-month low in April.

Only 13 of every 1000 employees were laid off that month, says the U. S. Bureau of Labor Statistics. That was the lowest rate since October, 1948, and reflects accelerated business and industrial activity. In April, 1949, 28 of every 1000 employees of manufacturing companies were being laid off.

Hiring of new workers and recall of previously laid-off employees continued in April at a rate of 35 per 1000, a pace that has been steady since the first of 1950. In April, 1949, the hiring rate was only 29 per 1000.

A good indication that job opportunities were increasing can be seen, the BLS says, in the quit rate. Moving upward since December, it reached 13 per 1000 in April.

May Steel Record Probable

The output of steel during May probably established a record exceeding 8.5 million tons, says the American Iron & Steel Institute. Pre-

NEA

GE WORKERS VEER TO RIGHT
. . . CIO gains edge in NLRB elections

viously, March, 1949, was the month of highest output at 8,401,796 tons.

CIO Wins by a Nose

Its IUE gets 49 local units at General Electric plant. The left-wing UE will represent 40

THE CIO's new electrical workers union, the IUE, won a narrow victory over the left-wing UE for representation at 57 General Electric Co. plants. The UE was thrown out of the CIO last fall, and the IUE was formed to try to take over the older union's membership.

The Scoreboard—Unofficial tabulations late last week of the 123 local units involved show this:

The IUE won 49 local units representing 53,971 employees.

The UE won 40 local units representing 36,703 employees.

Other unions won 11 local units representing 2300 employees.

Nine units—representing 481 motion study and related employees—voted for no union.

There will have to be a runoff election for nine units where no one union of the three or more running had a clear majority; only the two groups that got the most votes in these contests will run in the next.

Results of contests in five units were not yet determined, chiefly because of challenged ballots.

No contest existed in about 35 other units where GE already has contracts with unions other than the UE or IUE.

Local Option—GE probably will no longer be able to negotiate labor agreements on a company-wide basis, but will have to deal with each union separately. The decision by time and motion study employees for no union was a welcome one to the company.

The UE won two of the ten largest local units at stake—a production and maintenance workers group of about 13,000 (the biggest of them all) at Schenectady, N. Y., and a production and maintenance group of about 11,000 at Erie, Pa. The IUE won the other eight.

AFL Gets In—In elections that went to unions other than the IUE or UE, the AFL autoworkers group won the largest unit, at Danville, Ill.

The "popular vote," which technically has no bearing in the contest of strength but tends to show the cross-country division of sentiment between the two rivals, gave 47,496 for the IUE and 35,763 for the UE. There was a total of 95,944 eligible voters.

Who Gets $270,000?

Westinghouse Electric Corp. is asking the U. S. District Court in Pittsburgh to decide who should get some $270,000 of "checked-off" union dues withheld over a five-month period because of union representation disputes.

The civil action names the UE, the IUE, locals of both unions and a number of individual union members. Westinghouse asks that the court take custody of the funds and decide whom the money belongs to. The company asks that it be relieved of all further liability in the matter and that the court issue an injunction restraining any of the parties from suing the company for the money. Five such suits against the company now are pending in District Courts elsewhere.

Under the "check-off" provisions of the former Westinghouse-UE contract, the company withdrew union dues from the pay of employees who belonged to the UE and authorized such deductions. Normally, dues were then turned over to the local unions. Following the UE-IUE split, Westinghouse held up dues payments when it was not clear which unions or individuals had legal right to the money. "Checked-off" dues were held up in many locations from November, 1949, through March, 1950.

Mass Vacations: They're Popular

Plant closings for mass vacations of employees will be of greater scope in Cleveland this year than ever before.

Sixty per cent of the larger manufacturers will close from one to two weeks, J. W. Vanden Bosch, Cleveland Chamber of Commerce analyst, found in a survey. After three years' trial, advantages of the vacation closing system seem to be demonstrated and anticipated disadvantages failed to materialize, Mr. Vanden Bosch says. Company managements find the arrangement facilitates major maintenance and repair work, eliminates complicated work schedules and reassignments and brings about a net gain in efficiency. Employees welcome a fixed and guaranteed vacation date not subject to change due to fellow workers' illness or change in plans.

The survey shows 64 plants will close one week, 149 plants two weeks, two plants three weeks, and 182 plants will stagger vacations. The July Fourth week is by far the most popular vacation period among them.

Safety Award Won Twice

For the second consecutive year National Works of U. S. Steel's National Tube Co., McKeesport, Pa., won the National Safety Council's highest award.

The 7100 employees at National Works piled up 2,945,000 man-hours of working time without an accident that required an employee to be off the job. The plant operated 77 accident-less days to set the record.

Christy Park Works set a record of 1,121,862 man-hours of work without a lost-time mishap. The plant's 500 employees were on the job 386 safe working days in setting the mark.

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Republic Boosts Capacity

Expanded ingot output will go into cold-rolled sheet. Deliveries will begin next year

REPUBLIC Steel Corp. will be shipping about 137,000 tons more of cold-rolled sheet annually to its customers—but deliveries won't start until early 1951.

That's when expansion of Republic's Cleveland District plants is expected to be finished. Construction will start soon to boost the corporation's ingot capacity in Cleveland by about 11 per cent, or 182,000 tons yearly. All the added ingot production will go into cold-rolled steel.

A Quintet—Five major phases of construction involve:

Increasing the heat size on all 15 open-hearth furnaces at the Corrigan-McKinney plant in Cleveland to tap 220 tons per heat as compared with 200 tons now.

Structural changes in the open-hearth building, including strengthening of materials handling equipment.

Possible construction at the strip mill south of the open-hearth plant of a fourth slab heating furnace with a capacity of 100 tons per hour; a study is being made to find whether to do that or to enlarge the three present heating furnaces.

Increasing coil annealing capacity.

Purchase of a four-high 54-inch temper mill to replace two present two-high temper mills and to give additional rolling capacity for the increased tonnage.

Sylvania Will Expand Facilities

Sylvania Electric Products Inc., New York, will expand substantially its radio tube manufacturing facilities.

Sylvania will build a new plant at Shawnee, Okla. When completed about the first of next year, it will be producing over 1 million radio tubes per month.

Townsend Completes Expansion

Completion of a program that has doubled the capacity and increased the variety of cold-headed products—solid rivets, gadgets and other fasteners—made in its Chicago plant was announced by F. R. Dickensen, president of Townsend Co., New Brighton, Pa.

The Chicago plant was acquired by Townsend in 1928. The addition was built by H. K. Ferguson Co.; it involved a new bay area with 12,000 square feet of space and the installation of a number of cold-heading machines and equipment for trimming, slotting, pointing, machining, thread rolling, piercing, knurling, bending and flattening fasteners and small parts.

Carnegie To Add 174 Ovens

Two new coke batteries of 87 ovens each will be constructed beginning in September at the Clairton, Pa., works of Carnegie-Illinois Steel Corp., a U. S. Steel Corp. subsidiary. The project will probably cost more than $9 million.

The contract for the 174 by-product ovens has been awarded Koppers Co. Inc. The ovens will be of the underjet type designed for coke-oven gas heating, with recirculation of waste gases. They will be capable of carbonizing 5000 tons of coal every 24 hours to yield in the same period about 3300 tons of coke. The two batteries will go into operation in the late summer or fall of 1951.

High-Speed Alloy Tin Anode

A high-speed alloy tin anode for use in alkaline tin plating has been developed by Metal & Thermit Co., New York.

It operates at double the usual current density, films at little or no excess current density and provides a film that is darker and more easily recognizable, the company says. Price on the alloy will be announced at a later date.

East Coast, West Coast

Standard Steel Spring will operate plants on both coasts beginning next fall

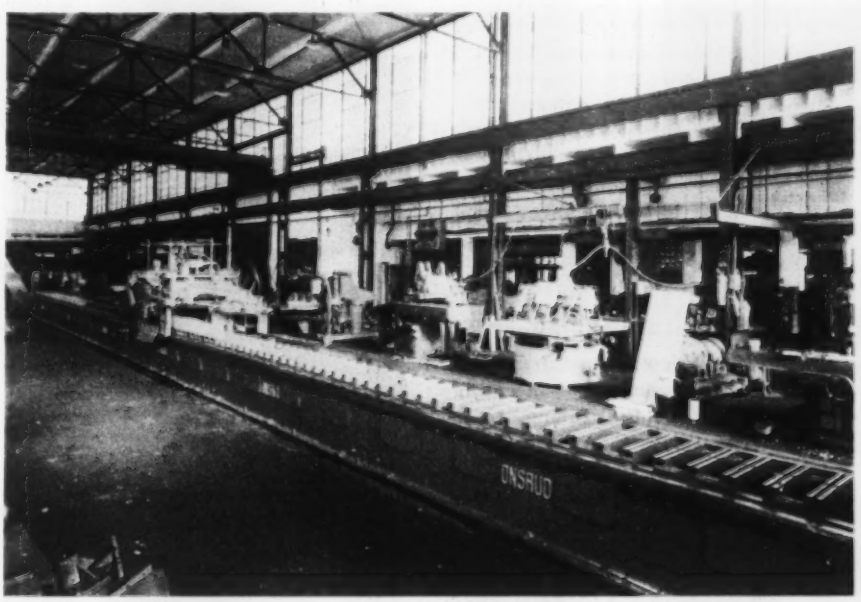
STANDARD STEEL SPRING Co. will put in operation this fall two new plants—one at Roebling, N. J., the other in Los Angeles. They will add about $1 million to $1,250,000 to monthly sales, the company figures.

The plants will supply seat and back cushion springs and tubular seat frames for passenger cars assembled on the coasts by one of the Big Three automobile manufacturers—name not disclosed.

Standard Steel Spring's total sales in the first three months this year were about $22 million. It is estimated that this total would have been $2 million higher if shipments had not been curtailed by the Chrysler strike.

A site for the West Coast plant was bought from Central Mfg. District Inc. Construction of the new plant—it will have about an 110,000 square foot area—is expected to be completed about Aug. 1. Eventually 350 persons will be employed.

At Roebling the company leased about 150,000 square feet of space from John A. Roebling's Sons Co. Installation of equipment at the plant will start about mid-June. Its em-



NINETY-FOOT MILLER: This aircraft spar beam milling machine is the latest and largest built by Onsrud Machine Works, Chicago. It is being shipped to Boeing Airplane Co., Seattle, where it will machine spars for heavy new jet planes developed for the government. Bed length is 90 feet and maximum carriage travel is 80 feet. It features automatic chip disposal and Thymotrol variable feed. High flexibility is provided, with automatic horizontal swarfing to 10 degrees off horizontal and automatic vertical swarfing 15 degrees off vertical. The machine weighs 60 tons

ployment is expected to reach about 600. Production will begin about Sept. 1 at Roebling and in late September or early October in Los Angeles.

Chicago Steel Plans Warehouse

Chicago Steel Service Co., independent Midwest distributor of stainless and carbon steels, will build a new office and warehouse in Chicago.

Walter D. Monroe, president, says plans call for a one-story, steel-frame structure with 120,000 square feet of floor space at a cost of about $1.5 million. The building should be complete by late fall. Although the company has been noted for its handling of stainless steel, it is doing a bigger job of supplying carbon steels than it has done in the past.

Bay State To Build Factories

Bay State Abrasive Products Co.'s board of directors voted an appropriation of $250,000 for additional factory buildings and equipment for the Westboro, Mass., firm. Work will start immediately.

It is the second major physical expansion that Bay State has made within the last year. A similar amount was invested in 1949. Additional facilities are to cope with the company's increased business.

Watertown Gets Moulded Metal

Watertown Mfg. Co., Watertown, Conn., acquired the physical assets of Moulded Metals Co. Inc., same city.

The purchase brings together a pioneer in the plastics industry and a company in the powdered metallurgy field. Existing facilities of the powdered metallurgy division were increased to handle large work in gears, cams, pole pieces and other applications.

B & W To Fabricate Tubing

Babcock & Wilcox Tube Co., Beaver Falls, Pa., will soon be fabricating seamless and welded tubing to a limited extent. B & W's primary work is manufacturing the tubing.

E. A. Livingstone, vice president, says "upon special request we have in the past done certain fabrication work for customers on a job basis, but growing demands to have basic fabrication of tubes done by the manufacturer instead of necessitating shipment to another plant has prompted us to form a department for this type of work."

Types of fabrication to be handled include: Bending; end-forming such as swaging, upsetting, flaring and expanding; flash buttwelding for safe-ending and making long length tubing; production of tubing with various cross section shapes and other specialty tubing work.

L.A. Spreading Out All Over

Plant expansion projects in Los Angeles county in March and April were the highest since March, 1937. April manufacturing investments for expansion accounted for $4,203,000. Construction of new manufacturing facilities totaled $8,043,500 in April, an increase of 44 per cent over March.

The rapid industrial growth of the Los Angeles area has continued to amaze even local optimists. Increases in the number of industrial plants and the value added to products in manufacturing process by Los Angeles plants was the greatest in the U. S. between 1939 and 1947. In that period the "value added" increased 300 per cent and the number of plants increased by 70 per cent.

Not alarmed over its "mushrooming," local observers consider the industrial growth of Los Angeles to be sound because of the industrial diversification achieved. Los Angeles now ranks as third or better nationally for 13 steel-consuming industries ranging from automobile assembly through jewelry. First is manufacture of aircraft and aircraft parts, pumps and compressors, refrigeration equipment. The area ranks second in the U. S. in automobile assembly, storage batteries, heating and plumbing equipment, oil field machinery, and third in petroleum refining, tractors and farm machinery, construction and mining machinery, and conveyor equipment.

50 MILLION CAN'T BE WRONG: Ekco Products Co., Chicago, mass producer of kitchenware, just rolled up a new world's record: It produced its 50-millionth Miracle can opener. Jack Kollman, vice president in charge of Chicago manufacturing, helps a worker celebrate the event

Blast Furnace Output Rises

The nation's blast furnaces turned out 5,577,020 net tons of pig iron, ferromanganese and spiegeleisen in April, the highest production since March, 1949, when 5,820,161 tons were produced.

American Iron & Steel Institute reports that the April tonnage compares with 4,601,041 tons in the previous month and 5,530,730 tons in April, 1949. For the first four months of this year, 19,644,640 tons have been produced, against 22,305,233 tons for the same 1949 period.

Kaiser Pipe Backlog Boosted

Signing by Kaiser Steel Corp. of a new $35 million contract for steel pipe for the Texas to Illinois natural gas line has boosted Kaiser's pipe backlog for eastern shipment to more than $100 million.

The new contract calls for 255,000 tons of steel line pipe, ranging in size from 10¾ in. to 26 in. in diameter, totaling about 10,000 carloads of pipe. Fabrication will be at Napa, Calif., in the San Francisco bay area, from plate rolled at the Fontana mill of Kaiser Steel.

This order sent the aggregate of Kaiser Steel sales, destined for eastern shipment to build pipelines, to a total of more than ¾ million tons.

Case Emphasizes Management

Case Institute of Technology has appointed Clay H. Hollister, former executive of the Marshall Plan's special mission to France, as head of the Department of Engineering Administration. The move is toward the development of a center for graduate study and research in the field of industrial management at Case.

Mr. Hollister is to continue the development of the undergraduate curriculum in Engineering Administration and to develop a graduate curriculum and research in the field of industrial management. He is the first permanent head of the department, which, since its establishment in 1946, has been in limited operation under direction of an acting head.

Part of the curriculum in the expanding department will be devoted to courses in corporate organization, human relations, economics and tools of management such as accounting and time and motion study.

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New Deal for Labor in Europe?

Advocates of the French-German economic union scheme say the plan may revive a free labor market. They point to benefits of a free market area in Scandinavia

ADVOCATES of the proposal for a common economic policy of French and German heavy industry argue that it may help revive the palmy days before World War I when Pierre Blanc or Fritz Schmidt could travel freely around Europe without their wallets bulging with passports, visas and work permits.

If Pierre or Fritz are out of jobs today but know where they can get one in another country, they may get it—but only after freeing themselves from a tangle of red tape.

Roaming in Scandinavia—Proponents of the French-German scheme point to the benefits of free labor in Scandinavia where a single free market is shaping up in Denmark, Sweden, Finland and Norway. For that area which has a combined population of 18 million, a program is being put into force that had a successful trial run in World War II. During the war, thousands of Norwegians and Danes fled to Sweden to escape the Germans. In February, 1945, some 90,000 refugees—mostly Scandinavian—were in Sweden.

"They could have become a problem, but they never did," says Dr. Bertil Olsson, acting head of the Swedish Labor Board. "The ease with which they were fitted into the economic pattern of the country gave the idea of a common northern labor market."

A Cushion Shot—The project is based on the theory that—because of the different economic structures of the four countries—unemployment is not likely to hit them all at once or in the same manner. Unemployment during a Danish depression could be relieved if Danes could freely migrate to Sweden where jobs are more plentiful, or vice versa. As of January, 1950, some 48,000 Danes, Norwegians, Finns and Icelanders were working in Sweden.

Here's the Scandinavian program: Sweden, population 7 million, and Denmark, population 4 million, have removed virtually all barriers for their citizens who want to try their job luck in either country. Labor exchange offices have been set up in both countries to assist all unemployed citizens of either nation. The agreement on labor exchange offices was first made between the two in 1946. A few months ago it was extended to Norway and Finland.

Pierre or Fritz:
Freed To Work Anywhere He Pleases?

Snip, Snip—Since Oct. 1, 1943, Sweden has done away with all the red tape by not requiring working permits from Danes, Norwegians, Icelanders or Finns. Norway, population 3.2 million, and Finland, population 4 million, still do, but only as a matter of form.

What if a worker fleeing unemployment in his own country fails to get work elsewhere within the common labor market area? All but Finland have mutual unemployment relief agreements: Through them jobless compensation is paid to the citizens of the countries involved—whether they are living in Denmark, Norway or Sweden.

Delegations from Belgium, Luxemburg, Italy, the Netherlands, France and West Germany will meet this month to work out details of the economic merger.

Will the time ever come when the French pay unemployment benefits to Fritz Schmidt when he's living in Paris?

Italian Workers Need Houses

Ask the Italian worker what he needs most and he'll probably say: "A house."

Four to six million Italians are still homeless five years after the war. Millions are badly housed. The Public Works Ministry estimates at least 7 million new homes are needed. The nation is so far behind on housing that it will take 20 years to catch up even if the present pace can be maintained. Although the situation presents a grievous social problem, industry sees it also as an economic cushion in bad times.

The government is tackling the problem with an $800 million, seven-year plan to build about 200,000 low-cost dwellings for employed workers. Payroll deductions, mandatory contributions by employers and government grants are paying for it.

The ECA is preparing a $32.5 million program for middle-class housing. Under the plan, 35-year, 4 per cent loans covering up to 75 per cent of the cost of the dwelling will be made through existing financial agencies. In the past, interest on such private loans has run from 8 to 14 per cent.

The United Nations Relief & Rehabilitation Administration program, which helped rebuild more than 300,000 dwellings, has been continued.

There's even a boom in private construction, but only for luxury dwellings.

The government is keeping tight its lid on rents. Rents of some three and four room unfurnished apartments in Rome run as low as $1.60 to $3.20 a month. Low, yes, but many Romans make less than $30 a month.

French Birth Rate Rises

The long-range labor outlook in France is changing because the nation has had a phenomenal birth rate increase. If the baby boom continues, France will have a population of 44 million by 1960. The present estimated population is 42 million.

France's spurt in the birth rate, normal for the early postwar years, is astonishing statisticians. The birth rates in Great Britain and the U. S., high after the war, have tapered off recently, but France's rate of 200 per 10,000 population has held steady for three years. In 1949, the birth rate was 207 per 10,000, or 40 per cent higher than the 1939 rate of 146 per 10,000. A similar situation existed in the early 1800s when France was a fast-growing nation, but there is a greater net gain in population now because of the lower death rate.

France can support an estimated 60 million persons before emigration will be needed.

Danish Plate Mill Finished

The plate mill that was being built for Det Danske Stallvaesevaerk A. S. at Frederiks-vaert is now completed and in operation. The output for 1950 is expected to reach 80,000 tons, compared with 45,000 tons in 1949. Shipyards will use most of it.

Food Equipment Business Fattens Up

Expansion of in-school and in-plant feeding broadens the market and swells order backlogs of producers of restaurant and kitchen equipment

LOOKING at what's "cooking," metalworking companies supplying equipment to the food service industry see a pretty good bill of fare business-wise this year.

These companies, producing refrigerators, mixers, ranges, dishwashers, serving tables and the numerous other kitchen appurtenances, notice their order backlogs are beginning the bulge. The result: Prompt delivery of some items is impossible. It now looks as though 1950 will be a better business year for them than 1949.

These companies' market is more than half a million commercial feeding establishments doing a combined business of $10 billion a year.

Restaurant business is either at or nearing its postwar low and new equipment seems to offer proprietors of eating establishments a means of cost-cutting and customer-enticing which will make "eating out" more popular.

Time To Eat—President of the National Restaurant Association, Andrew J. Crotty, sees indications that business is beginning to pick up. High level of industrial operations and payrolls should soon result in reversal of the downtrend that to date this year has amounted to about 7 per cent lower restaurant revenue than in 1949.

Equipment makers do not attribute too much of their sales upturn to restaurants. Institutional buying is the reason given by many for the improvement. Schools, particularly, offer a better market. Hospitals and government installations are also important.

Eat and Learn—Food preparation in schools used to be limited largely to colleges and high schools, officials of equipment companies which were exhibiting at the restaurant association show in Chicago said. Now, they say, the school building boom involves them directly. More attention is given to diet, and the old habit of carrying a sandwich or two is passing from the school scene. With one-room schools disappearing, in-school food preparation is more prevalent. In-plant feeding which became popular during the war is also moving forward, to the delight of equipment makers.

The commercial kitchen equipment market is estimated at about $400 million a year. Major metal-using items in that total, however, are substantially less.

The 1947 Census of Manufactures shows production value of commercial cooking and food warming equipment at $46.1 million, of which $17.7 million is accounted for by stoves, ranges, ovens and broilers, $16.6 million by griddles, toasters, deep fat fryers and coffee urns, and $11.8 million by food warming equipment, steam tables and the like. Commercial refrigeration equipment, one company says, adds about $97 million to this figure. On top of this are the mixers, scales, dishwashers, utensils and other metal items needed to aid in food preparation and its serving.

HOTPOINT'S NEW LINE OF COMMERCIAL COOKING EQUIPMENT
. . . for efficiency and eye appeal a glare-proof finish

Stainless Market—Much of the equipment used in mass feeding establishments is fabricated of stainless or stainless-clad steels. A substantial tonnage of castings also appears in the end products of the makers of mixers, food grinders, scales, etc. Chrome plated cold-rolled steel, enameled and galvanized sheets also figure prominently in the picture.

Tightness in steel supply is reported by all makers of this equipment, and a spokesman of Hobart Mfg. Co., Troy, O., expects it to remain a problem throughout this year. Other users note a lag in mill delivery of stainless, one remarking that the normal five to six-week wait has lengthened to about nine weeks.

On the sales front, equipment people are optimistic, but not without qualification. Kurt L. Seelbach of the Cleveland Range Co. and president, National Association of Food Equipment Manufacturers, expects the industry's volume to be good this year. Greater sales effort should be put forth by dealers of such equipment, he asserts. Lack of younger men who would enthusiastically sell equipment on the basis of cost-reducing features prevents full realization by manufacturers of the market potential, he believes.

Tricks of the Trade—Hotpoint Inc., Chicago, whose commercial cooking equipment sales were 25 per cent higher in 1949 than in the preceding year, has a program aimed at improving effectiveness of its own and dealers' sales organizations. To date, reports Orrin E. Wolf, vice president of the commercial division, more than 1300 men have graduated from a $25,000 sales training school which the division operates. Hotpoint's new line of commercial cooking equipment is mass-produced at its Chicago Heights plant.

The Hot-Point ranges have a new, bright, grease and glare-proof finish, a departure from the traditional black enamel. The commercial ranges and bake ovens are being finished in bright silver gray with signal lights and other innovations to increase ef-

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ficiency and improve eye appeal.

Hobart which also reports its 1949 sales at the highest level in history attributes introduction of new lines and improved product design for part of this showing. The company makes dishwashers, grinders, mixers, etc. A 26-foot long dishwasher constructed of 16-gage stainless steel with a conveyor of stainless wire nylon-tipped, is attracting trade interest that sales officials expect will turn into new production records this year.

Going Up—W. H. Douglas, general sales manager, Vulcan-Hart Mfg. Co., Baltimore, reports that restaurant acceptance of stainless steel cooking equipment is on the rise. Although twice as expensive initially as black equipment, stainless ranges have overtaken the more conventional finish in sales in certain sections just recently. Superior qualities of stainless equipment are proving it a better long-term investment, he claims. Fabrication with stainless is more difficult but the same equipment is successfully used for runs with both stainless and carbon steels. While sales were very good last year, 1950 will be even better, he comments.

Gale Blakeslee, vice president, G. S. Blakeslee & Co., Chicago, says business is "mighty good." School demand, he believes, will continue to support very active sales for his line of mixers, slicers, peelers, dishwashers and other food service items.

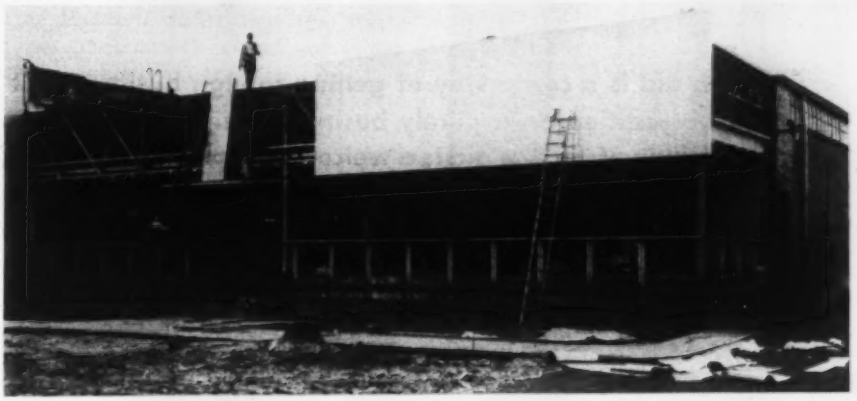
Out of the Fire—Sales of fryers, grills and hot plates made by Wilson Sheet Metal Products Inc., Chicago, are 40-50 per cent higher so far this year than last, Louis Terek states. The company has been able to reduce prices by economies in manufacture, such as having its sheets chrome plated before drawing, eliminating welding operations in door manufacture, and other ways. Success of drive-in restaurants has accounted for a considerable portion of the sales boost.

Using Monel metal, Lansing Mfg. Co., Cleveland, has been able to deep-draw a seamless tank for its dishwashing equipment. Company officials believe this innovation is responsible in part for its swollen backlog of orders, some still carrying over from last year.

More Welding Machines Sold

Shipments of resistance welding machines took a definite upturn in March, says the Resistance Welder Manufacturers Association. As compared to February, they increased 23 per cent. The industry's backlog of orders on Mar. 31 advanced 16 per cent over Feb. 28.

Steel Skeletons Sheathed in Stainless Steel



TRUSCON'S WAREHOUSE IN BALTIMORE
. . . curtain walls basically a sandwich of steel

IF DEVELOPMENT ENGINEERS of Republic Steel Corp. had their way, buildings of the future would be steel skeletons sheathed in steel panels topped with stainless steel.

After years of designing, engineering and testing insulated stainless steel curtain walls (called that because with the advent of structural steel frames, walls were only necessary for insulating purposes), Republic applied its know-how for the first field use of the material in a new single-story warehouse completed for Truscon Steel Co., Republic subsidiary in Baltimore.

Photo at the top shows the curtain wall—steel panels and stainless steel facing—which weighs from 6 to 10 pounds per square foot, depending on insulation and thickness. It takes from 100 to 175 pounds per square foot for masonry walls. Besides the saving in weight, another advantage is achieved: Added floor area. The 5-inch thick stainless steel walls take the place of 14 inches of masonry; a builder can get ¾ foot of rental floor space for each linear foot of wall that he plans for each floor.

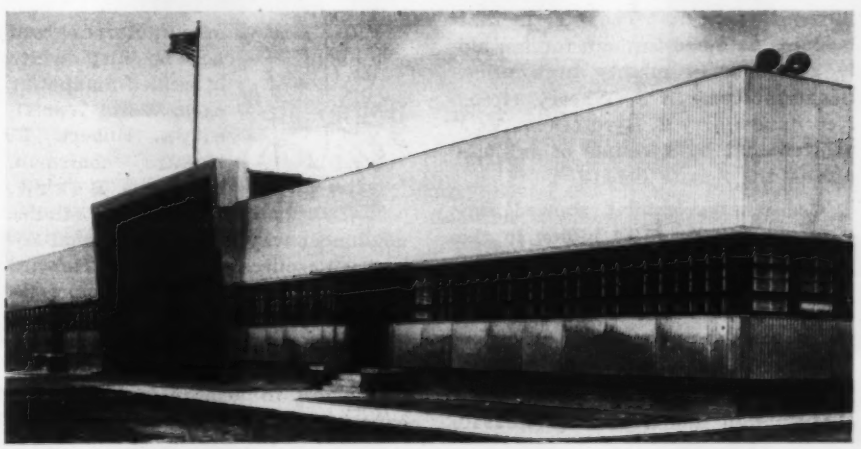
The curtain walls are basically a sandwich made of steel pans enclosing lightweight insulation. The exterior sheet is high-grade corrosion-resistant stainless steel; the interior sheet is carbon steel. Steel panels are shop fabricated, insuring a more accurate and speedier fit. They are attached to continuous structural angles fastened to the structural skeleton.

Another Added in Youngstown

Truscon Steel Co. will build a new warehouse to house building materials next to its present plant in Youngstown. The plant and its equipment are expected to cost about $1 million. It will be one of 26 warehouses operated by Republic's Warehouse Division.

The warehouse will be a one-story building with 100,000 square feet of floor space. Truscon is fabricating the building materials for it. W. D. Widmer, Youngstown sales manager, will have offices in the building; Walter Klenn was named superintendent of the plant.

SHOP-FABRICATED STEEL PANELS
. . . added: ¾ square foot of space for each linear foot of wall



Windows of Washington

By E. C. KREUTZBERG *Washington Editor, STEEL*

Foreign aid is a costly way of getting foreign business that can't be justified on a purely business basis. But the business resulting from the aid is a welcome by-product

IF CONGRESS appropriates the $3.2 billion it authorized for the Economic Cooperation Administration in fiscal 1951—and expectations are that appropriations will be near that figure—the outlook for export business will be good.

Foreign aid expenditures, besides hindering the spread of communism, bring in a lot of business and employment that the U. S. ordinarily wouldn't get. Export statistics of the Commerce Department show that Marshall Plan countries account for one-third of our exports. In 1949 exports came to $12 billion; ECA countries took $4 billion of it.

Latin American Relaxation—Several factors indicate our opportunities for export business should continue good indefinitely: Congressional debate showed that foreign aid will be with us for some time yet—although it will taper off gradually. The administration is working on plans to improve Europe's dollar position (one plan would be to encourage more imports of goods that we need and that can be brought in without disturbing home industry too much). Improving dollar position of many other countries, particularly the Latin American group, promises more relaxation of present import restrictions.

Is the Price Right?—Some government officials and some members of Congress think that foreign aid is not so costly as the cold figures indicate. Their chief reason for thinking so is the volume of export business that the aid generates. But quite a controversy could be worked up on that point. The fact is that business obtained through foreign aid is gotten at a mighty high price. Senators Kenneth S. Wherry (Rep., Neb.) and Harry F. Byrd (Dem., Va.) showed that by a couple of exhibits during the Senate debate.

The Wherry exhibit showed foreign aid cost us $75.4 billion in the period July 1, 1940, through June 30, 1949. It cost us $48.7 billion in the war period July 1, 1940, through June 30, 1945, and $26.7 billion in the postwar period July 1, 1945, through June 30, 1949. The figures showed that foreign aid from July 1, 1940, to date—without counting what has been spent since June 30, 1949—comes to 27 per cent of our present national gross debt of $256 billion.

Watchdog of the Budget — The Byrd exhibit showed that current foreign aid breaks down into some 26 items, and that the total expenditures for all these items will come to about $5.8 billion in the fiscal year that will expire on June 30. It showed foreign aid in the year ending June 30, 1951, will come—not to the $3.2 billion authorized for the ECA—but to about $4.8 billion. Thus in the present year our foreign aid is costing nearly $40 for every man, woman and child. In the year starting July 1 it will come to $32.

Clearly that is an expensive way to obtain foreign business, and it cannot be justified on a purely business basis. But viewing foreign aid strictly on its place in our overall foreign policy, the business that results is a valuable by-product.

Reciprocal Military Buying Urged

Reciprocal military purchasing between Canada and the U. S. as a means of bolstering defense of the North American continent is endorsed by the Chamber of Commerce of the United States.

The plan approved by the chamber calls for new legislation to allow U. S. defense forces to buy small quantities of equipment in Canada, so that Canada can earn the dollars she needs to buy U. S. equipment.

'We Appreciate Critical Skills'

In another war, manufacturers will not be bled white of skilled manpower as in World War II, says Hubert E. Howard, chairman, Munitions Board. Alluding to studies now under way with the National Security Resources Board, Mr. Howard says "we now have a better appreciation of value of critical skills and how to use them."

Approximately 300 skills requiring two years to acquire and that are expected to be in short supply in wartime have been listed. "Our plans will provide that persons having one of these skills will be drafted only to the extent and in the numbers definitely needed for that skill by the armed services. We assume a local Selective Service Board will determine who will be deferred on an individual basis. We also assume that plant management will make requests for deferment of those with critical skills and will, at the same time, economize on their use."

Speed Demon—And How!

Interested in speed photography? A scientist at the Army's Aberdeen, Md., Ordnance Proving Ground has taken photographs in color and in black and white at a speed of 100-millionth of a second. How'd he do it? By a system of mirrors and grids. If you want more information, write to the Public Information Officer, Army Ordnance Proving Ground, Aberdeen.

The photos taken at the breath-taking speed are being used in shock and detonation research. Indications are that pictures may be taken with the same camera at speeds up to one ten-billionth of a second. Whew!

Foreign Trade Office Opened

To aid American businessmen interested in doing business with Greece, the Greek government's Foreign Trade Administration opened an office at 729 Fifteenth street N. W., Washington. The office is under the direction of P. Vachaviolos. His telephone number is STerling 4751. This office, as part of its services, is accepting subscriptions to the monthly journal published by the Greek-American Chamber of Commerce in Athens; the journal specializes in publicizing Greek requirements, bid dates, etc.

NACA Bill Provisions

Major improvements provided for in the House-passed National Advisory Committee for Aeronautics authorization bill include:

A $4 million installation at Langley Aeronautical Laboratory, Langley Field, Va., to permit research in the effect of speed, weight and different types of loading on safe landing of airplanes; an $11 million improvement in the 16-foot wind tunnel at Ames Aeronautical Laboratory, Moffett Field, Calif., to permit speeds

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25 per cent higher than the speed of sound; and an $800,000 improvement at Lewis Flight Propulsion Laboratory, Cleveland, to permit use of the altitude equipment there in research work on jet engines. The bill requires Senate action and an actual appropriation.

No Action on Synthetic Fuels

There will be no congressional action this year to promote a synthetic fuel industry with government aid.

The two interested committees, House Interstate & Foreign Commerce and Senate Interior & Insular Affairs, deferred action until the next session. The Wolverton bill, H. R. 566, proposes to authorize the Reconstruction Finance Corp. to loan up to a total of $250 million to private firms for the construction of three or four commercial plants to produce liquid fuel from coal and shale oil. The McCarren bill, S. 6, is for the same purpose but would authorize loans to a total of $650 million.

Political Stalwarts Rewarded

Two stalwart Truman supporters were rewarded for their service when the President nominated them to two key federal jobs. James M. Mead, former colleague of Mr. Truman in the Senate, becomes chairman of the Federal Trade Commission. Mon C. Wallgren, ex-senator from Washington, becomes head of the Federal Power Commission.

The president also appointed Maj. Gen. Philip B. Fleming (U.S.A., Ret.) to the newly created post of undersecretary of commerce. General Fleming was chairman of the now abolished Maritime Commission which was broken into two units—the Federal Maritime Board and the Maritime Administration—and put under the jurisdiction of the Commerce Department.

Mr. Mead, who was appointed to the FTC several months ago, takes over the chairmanship of the commission from Lowell Mason, a Republican, who has been acting chairman. Mr. Wallgren, who went to the FPC earlier this year, succeeds Nelson Lee Smith, a political independent. Mr. Wallgren was nominated for the chairmanship of the National Security Resources Board by the President last year. The appointment died, though, when Sen. Harry Byrd (Dem., Va.) joined with six Republicans in shelving the nomination.

NEA

MON C. WALLGREN
Federal Power Commission Head

NEA

JAMES M. MEAD
Federal Trade Commission Chairman

Titanium Report Available

The extensive research report on titanium alloys, prepared by the P. R. Mallory Co., Indianapolis, for the Navy's Bureau of Aeronautics, is now available for public distribution. Named "PB 100,000, The Manufacture of Titanium Alloys," it is obtainable at $4.50 in microfilm, $13.75 in photostat, from the Library of Congress, Photoduplication Service, Publication Board Project, Washington 25. Orders must be accompanied by check or money order made payable to the Librarian of Congress. The photostat copies run 108 pages including graphs, tables and photographs.

The report includes reference to the 5 per cent chromium, 3 per cent aluminum, titanium alloy described by the Navy as having the strength of high-strength steel with only about half its weight. It contains tabulated results of the following constituents in titanium alloys: Carbon; copper; manganese and silicon, alone or in combination. Aluminum, chromium and carbon are described as forming "strong, ductile, high electrical resistance alloys" with titanium. Alloys of either chromium and aluminum alone have little or no ductility, but show improved hardness at elevated temperatures. The report describes in detail the melting furnace, the preparation of charges, and the production of ingots.

NEA

MAJ. GEN. PHILIP B. FLEMING
Undersecretary of Commerce

Five More Years of Smelting?

The government-owned tin smelter at Texas City, Tex., may be operated for five more years. Harley Hise, chairman of Reconstruction Finance Corp., recommended it to Congress. The measure is now before the two banking and currency committees in Congress. The present authority to operate the plant expires June 30, 1951.

IH Releases Patents

International Harvester, Co. released 62 additional patents for licensing on reasonable terms. Listed in the May 30 issue of the Patent Office's *Official Gazette*, they cover mainly accessories and parts for tractors, cotton pickers and other agricultural machinery. These are in addition to more than 1300 patents previously released by the company for licensing.

Some important contribution to the "Register of Patents Available for Licensing or Sale" is that of Linde Air Products Co., New York.

It comprises 86 U. S. patents on the manufacture, distribution and gasification of liquid oxygen.

The Davenport Story —by Alcoa

New plant rising on former Iowa cornfield rolls world's widest aluminum sheet and plate. Capacity, now rated at 15 million pounds monthly, can be quickly doubled

THE OUTLOOK for peace was bright when the Aluminum Co. of America conceived its new rolling mill at Davenport, Iowa. That was back in 1946.

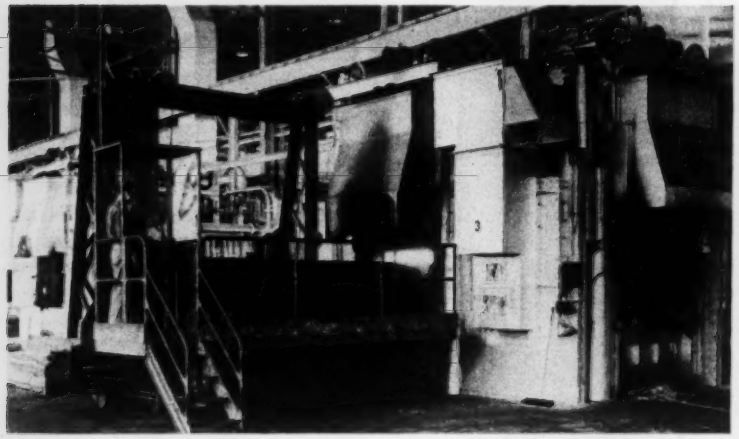
World War II fighting had ended only a few months before. The United Nations was in process of being born. Hopes ran high that the victorious nations could co-operate to control international aggression.

But Alcoa officials in planning the world's largest aluminum sheet and plate mill wrote in expansible features which will come in mighty handy if America enters a new emergency.

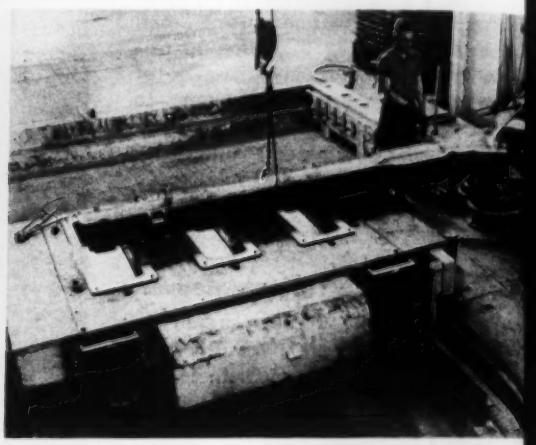
With Priorities, Quicker—By adding another hot mill and new melting hearths in spaces already provided, Alcoa can double its capacity for rolling wide sheet and plate. And that in the time required to obtain and install the new equipment—three or four months with priorities.

Alcoa will not necessarily wait for a war to begin before it expands these facilities.

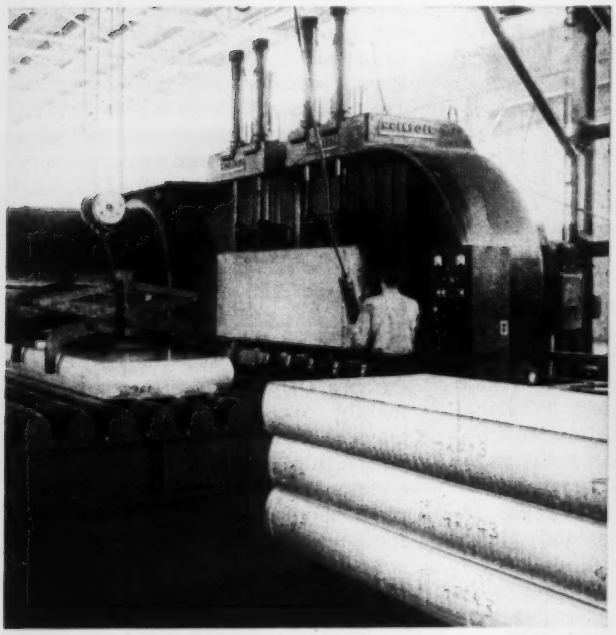
Davenport works is producing at about 80 per cent of its 15 million



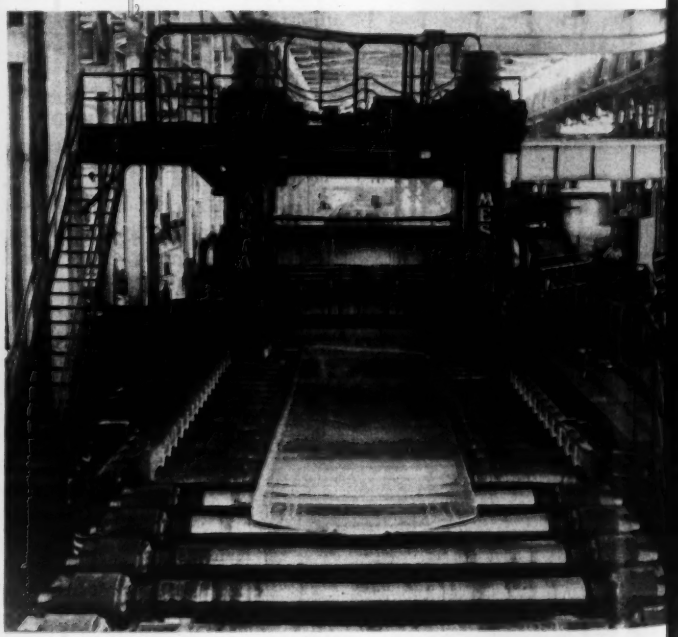
CHARGING aluminum pig and scrap metal into the melting hearth is easy and safe with this mechanical charging machine. After melting and alloying, the metal is . . .



CAST by the direct chill process into ingots weighing up to 7200 pounds and measuring 12 feet length. Ingots then undergo . . .



SCALPING in a milling machine that cuts away rough surfaces, leaves smooth finish needed to roll sheet or plate. After heating, ingots go to . . .



BREAKDOWN mill to be rolled into slabs. This unit is 144-inch reversing mill equipped with 5000-horsepower mo capable of 10,000-horsepower peaks. Slabs move to . .

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pound monthly capacity. Shortage of pig aluminum, not orders, prevents full operation. Substantial quantities of pig aluminum are being purchased in Canada. When new Alcoa reduction works in this country step up output, the company may add the new equipment.

Demand for aluminum products now is equaling the peacetime peak demand of 1948 and exceeds production slightly.

Good Housekeeping—The Davenport works is remarkable for several reasons in addition to its expansibility: 1. It produces the widest aluminum sheets and plates available; 2. it features aluminum in architectural applications on a scale not previously attempted; 3. it is a model in industrial plant housekeeping.

The 144-inch hot mill is rolling plates 140 inches wide. The 100-inch continuous mill rolls sheets 90 inches wide.

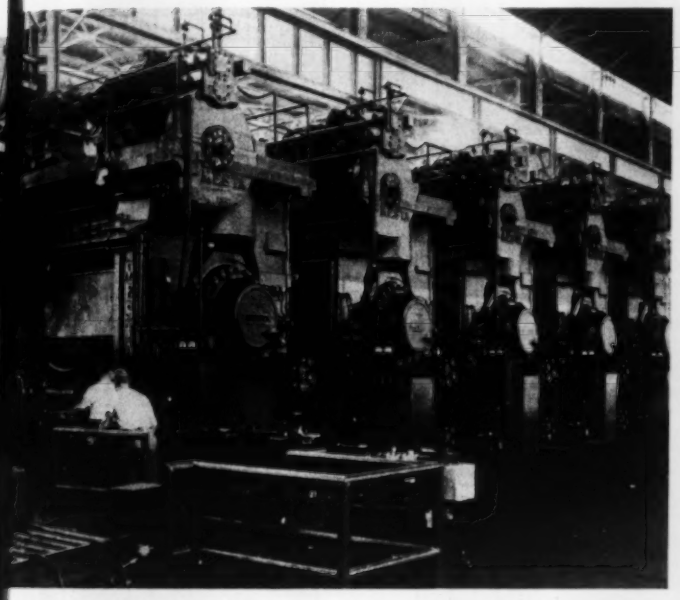
The extremely large sizes are making possible new applications of aluminum. Heavy plates are being rolled for tank car construction and for use in new model aircraft.

Architectural Bid—Davenport is Alcoa's bid for a larger share in the construction market. Aluminum is used wherever possible in the plant's construction—walls, roof, sash, air-conditioning ducts, piping, foil as vapor barrier, etc.

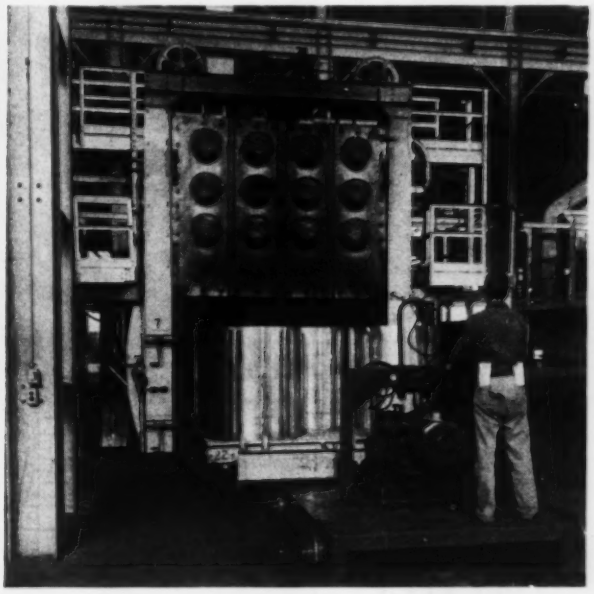
Even the structural steel framework of the building is coated with aluminum paint.

The works administration building utilizes cast aluminum spandrels backed up with precast, lightweight concrete. It is designed as a guinea pig for other aluminum buildings, including a 30-story office structure that Alcoa will erect in Pittsburgh.

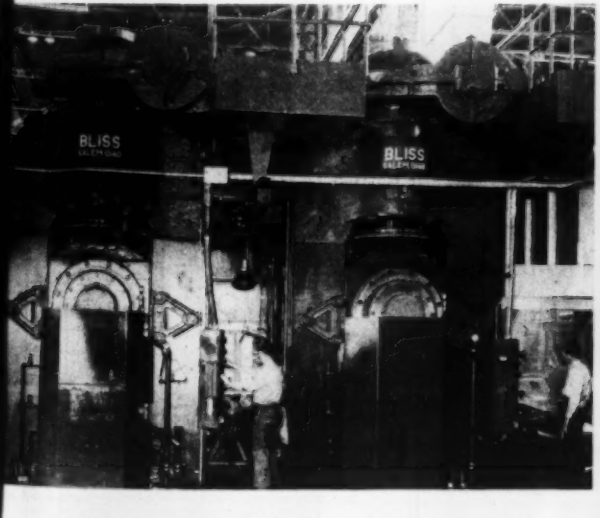
Accompanying photographs and captions describe the highlights of the works' operations.



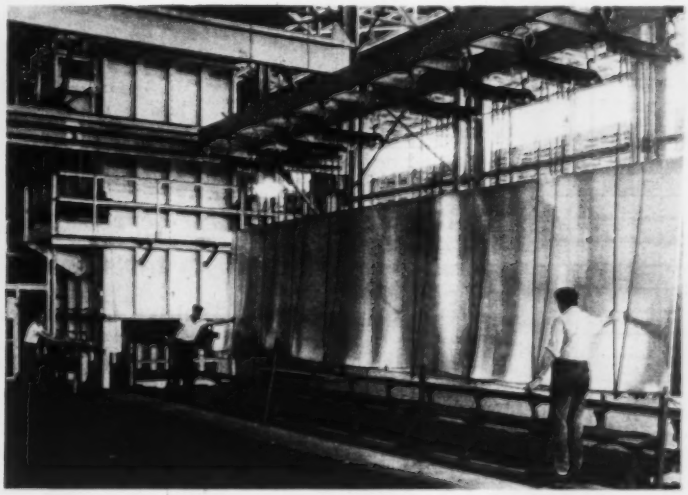
OT CONTINUOUS mill, a 5-stand, 4-high 100-inch unit uipped with five 4000-horsepower motors. Here the slab is reduced to strip ⅛-inch thick. Coils are . . .



ANNEALED in furnaces like these. This is to provide proper mechanical properties specified by customer or to soften metal for further rolling



OLD ROLLING on 4-high tandem mill reduces the hickness of aluminum sheet, improves grain structure and provides the desired finish



HEAT TREATING hardens and strengthens aluminum alloys as required for particular uses. Note size of plate about to be placed in heat treat furnace

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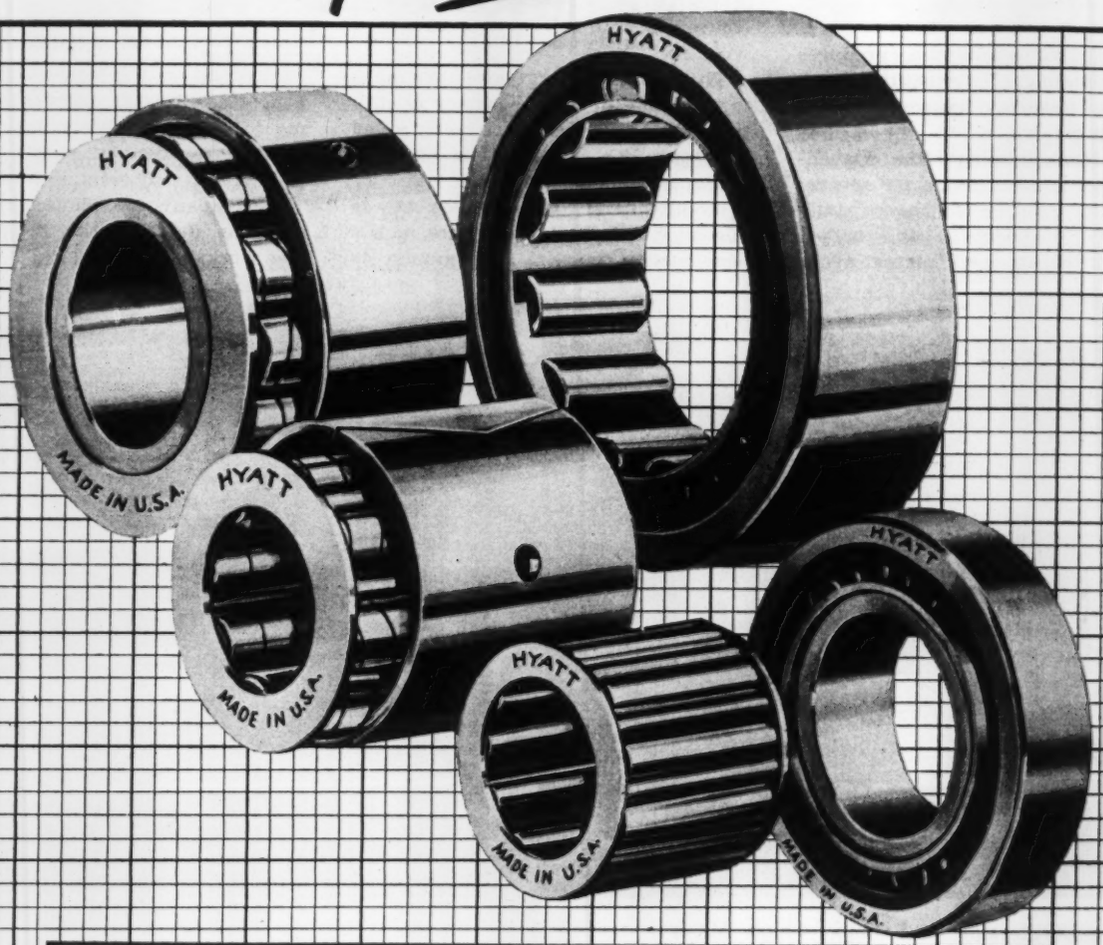
HYATTS *pay off* in performance



Hyatt Roller Bearings are purposely designed and built *first* to *last*.

Steel manufacturers, aware of this, have built Hyatts into their equipment over the years for the long life, ease of maintenance, economy of lubrication and trouble-free operation that this better bearing application assures.

Because Hyatts pay off in steady performance any place in the mill, they are the preferred bearings for new equipment and changeovers alike. Want further information? Hyatt Bearings Division, General Motors Corporation, Harrison, N. J., Chicago, Detroit, Pittsburgh and Oakland, Calif.

HYATT ROLLER BEARINGS

By A. H. ALLEN *Detroit Editor, STEEL*

Mirrors of Motordom

Auto production in first five months 20 per cent over 1949. First half output likely to reach 3.7 million units. New records being established each week

DETROIT

DURING a breather over the lengthy Memorial Day holiday when a number of plants—General Motors, Packard, Nash, Studebaker and some parts sources—closed from Friday to Wednesday, the industry took the opportunity to squint at the record of the past four months and then to take a long look ahead.

The view in the rear mirror was particularly pleasant, more than 3 million cars and trucks having been built in the U. S. and Canada since Jan. 1, official figures showing a total of 2,311,858 in four months and estimates indicating another 700,000 were added in May, the latter month breaking all existing records.

Thus, with production in the same period last year reaching a little better than 2,500,000 the pace this year is 20 per cent faster and by every indication the first half should see the turnout of an almost unbelievable 3.7 million vehicles.

Brags Justified—These are indeed bright days for the industry's tom-tom beaters who practically week after week can find something new for their "brag" sheets. Run down the latest collection and you find:

Chrysler Division has inaugurated a production schedule of at least two shifts in all manufacturing departments and three shifts in machine shops—all two-shift departments working nine hours a day.

Kaiser-Frazer assembly lines are working overtime, providing a 45-hour week to 11,000 employees, the latter figure up from 3000 in a little over 60 days, volume better than 600 units a day and due for a sharp increase in a few weeks.

Hudson deliveries for the week ended May 20 totaled 4160, up 17 per cent from the same week last year but still leaving field stocks 43 per cent lower than a year ago.

Mercury sales for the second ten-day period of May were 11,317, or 10 per cent over the April level.

DeSoto Sets Record—DeSoto built more cars during the week ended May 20 than in any previous week in its history.

Chevrolet sales May 1-10 were 3100 higher than in the same April period, totaling 54,520, of which 12,320 were trucks.

Buick pushed out 40 per cent more cars in the first 20 days of May than a year ago and boosted total deliveries for 1950 to 47 per cent over the same interval of 1949. Only the recent rail strike prevented dealers from realizing the third month in a row of better than 50,000 shipments.

Oldsmobile sales for the year through May 10 were up 59 per cent from 1949 and in the first ten days of May aggregated 11,640, an advance of 33 per cent over last year.

Nash sales in the first ten days of May climbed 54 per cent over a year ago, totaling 5160.

Eventually you run out of synonyms for "up."

Happy Days Ahead—Peering into the onrushing summer, few danger signs are seen, and the stabilizing effect of General Motors-UAW agreement on a five-year contract has made the production picture even firmer. The burden of proof now is on the market. Even if sales should slump in the near term, it will take possibly a month to build up stocks in the hands of dealers commensurate with today's level of sales.

GM Settlement Inflationary?

Whether the General Motors contract is inflationary or not is a hot subject for conversation among suppliers. Many of them figure it definitely is because of the additional outlays involved for pensions and insurance. If similar arrangements are going to be necessary for all suppliers, they reason that a price advance is the only way to absorb them. Already there has been a breakthrough in some steel items, and if this becomes general there will be added onus on materials and parts sources that they will be tempted to pass on to auto company buyers. However, few observers see any likelihood of another jump in automobile prices.

In a recent radio interview Sen. Robert A. Taft said he thought the GM agreement was a good one but he had one question relating to the "annual improvement factor" of 4 cents an hour which GM guaranteed over the next five years. He acknowledged this would have to come out of improvements in productivity yet wondered how the same benefits were going to be passed on to other worker and consumer groups not in General Motors. One way, of course, would

RECORDS BUSTING OUT ALL OVER: GMC trucks roll off assembly lines in record numbers as the GMC Truck & Coach Division of General Motors Corp. meets unusually heavy demand throughout the country. The 1950 models you see here include a 280, 620, 250 and 750 series diesel that went to dealers who established the highest sales record in the division's history last month

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be for the resulting improvements in productivity to provide sufficient margin to allow lowering automobile prices. Senator Taft said he was not sure this margin would be realized.

Can Be Realized—In Detroit's viewpoint he need not worry. The thoroughness with which General Motors statisticians and labor economics groups have studied and analyzed the problem leave little doubt that the 4-cent annual improvement factor is well within the limits of realization. All GM divisions have a constant drive on costs and methods to improve productivity. Weekly cost meetings of all supervisory forces go over every department with a fine-tooth comb to determine how it is progressing in meeting "cost reduction bogies."

Ideas come from all directions. The men on the machines are continually thinking for better ways to do the job, for it means money in their pocket if they come up with a usable suggestion. Likewise foremen have a primary responsibility for searching out cost reduction means. And so on all the way up to GM's central production engineering section which, through continuous committee activity, sees that all divisions are posted on cost-cutting methods developed throughout the corporation.

In the next few years GM's brand new "brains center" will provide a strengthened foundation for advanced engineering and more effective operating techniques. It will not supersede any divisional engineering facilities, rather will reinforce them, as Chairman Alfred P. Sloan Jr. recently stated, by the creation and development of advanced patterns, requiring time, facilities and personnel normally outside the scope of an operating organization charged with the responsibility for problems of the hour.

Working on New Transmission

Also on the calendar of new developments is a revised type of automatic transmission on which General Motors Detroit Transmission Division has been working for a considerable period of time. It combines features of the torque-converter type of transmission and the Hydra-Matic design, with provision for locking out the converter at cruising speed in the interest of economy. Presumably Cadillac will be the first to use the new design. Buick engineers have stated they expect no basic change in their use of the Dynaflow transmission in the "foreseeable future," and Chevrolet is committed to the torque-converter principle for an indefinite period, so this leaves only Cadillac and Oldsmobile plus the possibility of Pontiac, as prospects for a revised design.

Hudson is expected to offer some type of automatic transmission, other than its present unit which is not, strictly speaking, an automatic type. One report is to the effect the choice will be General Motors' Hydra-Matic, although a test car recently was being equipped with the torque-converter transmission now being built for Studebaker by the Detroit Gear Division of Borg-Warner.

Auto, Truck Output

U. S. and Canada

	1950	1949
January	609,882†	445,092
February	505,593†	443,734
March	610,678†	543,711
April	585,705*	569,728
Four months	2,311,858	2,002,265
May	702,000*	508,101
June		523,689
July		604,351
August		678,092
September		657,073
October		601,021
November		474,731
December		384,318
Total		6,533,641

Weekly Estimates

Week Ended	1950	1949
May 13	174,480	118,199
May 20	178,314	116,878
May 27	183,670	117,703
June 3	130,000	98,087

Estimates by Ward's Automotive Reports

* Preliminary.

NEA

CONTINENTAL APPEARANCE: This Hudson being lowered into the hold of an Army transport in New York appeared in the Berlin International Automobile Exhibition that ended yesterday. The exhibition was sponsored by the U.S. State Department to show products resulting from co-operation between American industry and labor

Olds May Use Leaf Springs

Shift to leaf springs from coils in rear suspensions of the 1951 Oldsmobile line is reported in the trade. Olds was one of the first to adopt coil springs before the war and Buick followed suit at approximately the same time.

The change back to the leaf design was dictated by elements of cost and improvement in ride quality and stability. It is not known as yet just what type of leaf spring will be adopted. Cost advantages of the three-leaf "broadbeam" spring might make it an acceptable choice, and again the favorable ride characteristics of the variable-rate type of spring would recommend its selection.

Look at the Records

For those interested in keeping accurate track of automobile industry records, R. L. Polk & Co., statistical experts, have developed some pertinent figures:

Best New Car Sales Years
(Based on registrations)

1. 1949	4,838,342
2. 1929	3,880,206
3. 1941	3,731,166
4. 1948	3,490,952
5. 1937	3,483,752

Best New Truck Sales Years
(Based on registrations)

1 1948	1,035,174
2. 1949	961,961
3. 1947	879,132
4. 1941	640,697
5. 1946	625,649

Best Month in New Car Sales

1. May, 1941	514,478
2. March, 1950	494,770*
3. August, 1949	478,556

* Estimated

Best Month in New Truck Sales

1. April, 1948	108,168
2. May, 1948	100,614
3. July, 1948	94,056

Total U. S. Registrations
July 1, 1949

Cars	32,730,718
Trucks	7,087,633

Average Scrappage Rate
1925-1949

Cars	1,601,940
Trucks	258,980

Polk also figures the four top states in total car registrations are California, New York, Pennsylvania and Ohio; in truck registrations California, Texas, New York and Pennsylvania.

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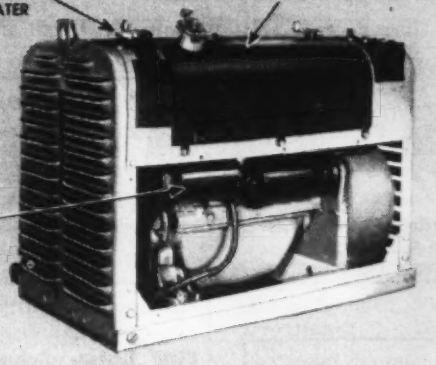
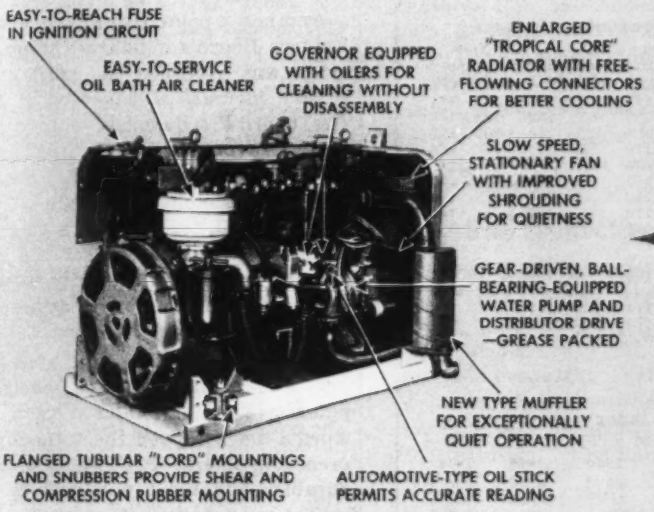
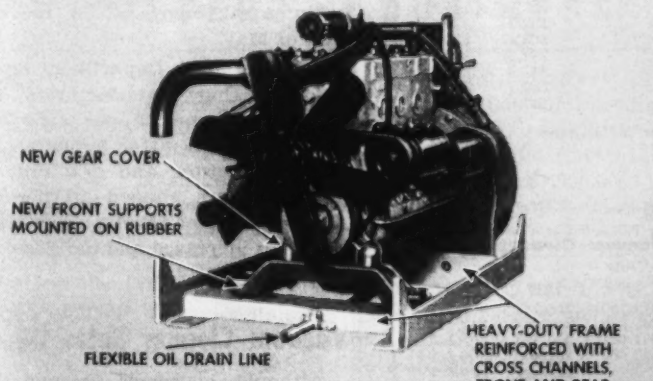
MORE THAN 16 IMPORTANT NEW CHANGES!


PRESSURE CAP COOLING SYSTEM TO PREVENT LOSS OF WATER
OUTSIDE FUEL TANK SET INTO RECESSED HOUSING PREVENTS SPILLAGE INTO UNIT
BELT-DRIVEN CHARGING GENERATOR WITH BELT TAKE-UP


EASY-TO-REACH FUSE IN IGNITION CIRCUIT
EASY-TO-SERVICE OIL BATH AIR CLEANER
GOVERNOR EQUIPPED WITH OILERS FOR CLEANING WITHOUT DISASSEMBLY
ENLARGED "TROPICAL CORE" RADIATOR WITH FREE-FLOWING CONNECTORS FOR BETTER COOLING
SLOW SPEED, STATIONARY FAN WITH IMPROVED SHROUDING FOR QUIETNESS
GEAR-DRIVEN, BALL-BEARING-EQUIPPED WATER PUMP AND DISTRIBUTOR DRIVE —GREASE PACKED
NEW TYPE MUFFLER FOR EXCEPTIONALLY QUIET OPERATION
FLANGED TUBULAR "LORD" MOUNTINGS AND SNUBBERS PROVIDE SHEAR AND COMPRESSION RUBBER MOUNTING
AUTOMOTIVE-TYPE OIL STICK PERMITS ACCURATE READING


NEW GEAR COVER
NEW FRONT SUPPORTS MOUNTED ON RUBBER
FLEXIBLE OIL DRAIN LINE
HEAVY-DUTY FRAME REINFORCED WITH CROSS CHANNELS, FRONT AND REAR

Announcing

The NEW READY-POWER

GENERAL PURPOSE

MODEL H-A

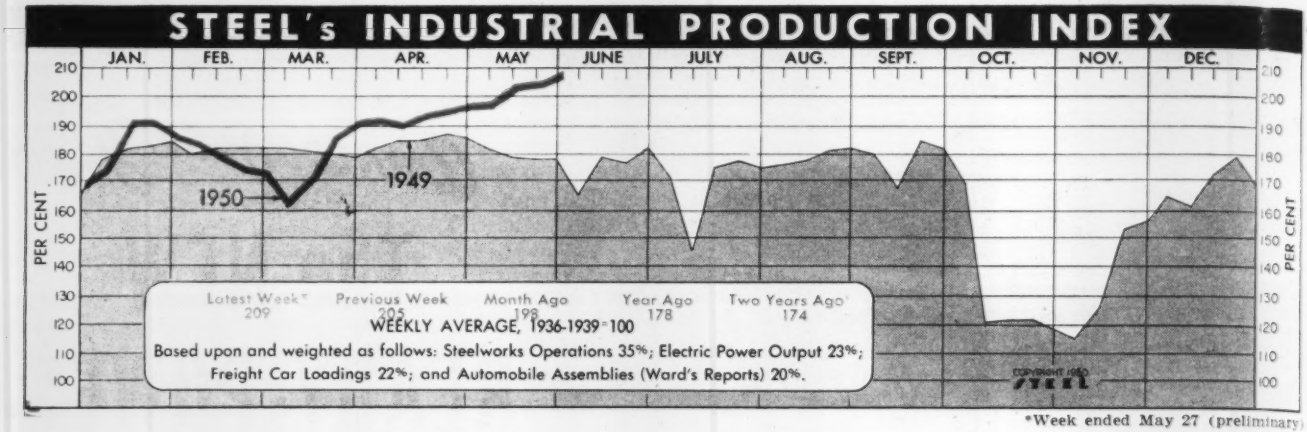
GAS ELECTRIC POWER UNIT FOR ELECTRIC INDUSTRIAL TRUCK OPERATION

"Making a good unit better" was the theme in the development of the finest, most modern Ready-Power Unit ever presented. Refinement features pointed towards important new advantages: remarkably quiet operation; less maintenance; ease of adjustment and complete accessibility. These add up to even longer life and lower operating costs than previous Ready-Power models offered. The new Ready-Power Model H-A has been work-tested and proven under the toughest of conditions. It is designed to replace existing Ready-Power Model "H" units and older models commonly used on Electric Trucks of the following capacities: 4,000 lb. Fork, 6,000 lb. Crane and up to 10,000 lb. Platform.

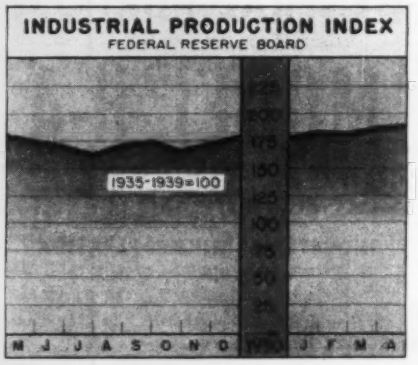
The READY-POWER Co.
3824 Grand River Ave., Detroit, Mich.

Write for Complete Information

READY-POWER


STEEL's INDUSTRIAL PRODUCTION INDEX
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.
PER CENT
1950
1949
Latest Week* 209
Previous Week 205
Month Ago 198
Year Ago 178
Two Years Ago 174
WEEKLY AVERAGE, 1936-1939=100
Based upon and weighted as follows: Steelworks Operations 35%; Electric Power Output 23%; Freight Car Loadings 22%; and Automobile Assemblies (Ward's Reports) 20%.
COPYRIGHT 1950 STEEL

*Week ended May 27 (preliminary)

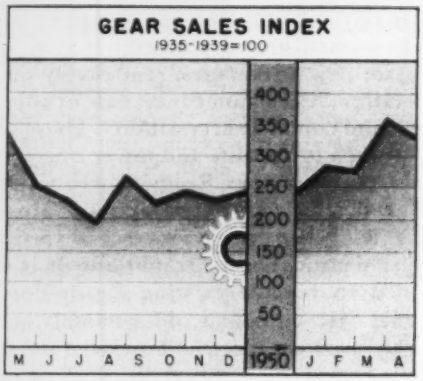


Charts—Copyright 1950, STEEL

Industrial Production Indexes

	Total Production		Iron, Steel		Non-ferrous	
	1950	1949	1950	1949	1950	1949
Jan.	183	191	203	228	179	184
Feb.	181	189	201	232	188	185
Mar.	187	184	205	233	199	183
Apr.	189	179	222	219	198	168
May	...	174	...	204	...	145
June	...	169	...	177	...	132
July	...	162	...	156	...	128
Aug.	...	170	...	178	...	141
Sept.	...	174	...	179	...	157
Oct.	...	166	...	103	...	164
Nov.	...	173	...	144	...	163
Dec.	...	180	...	198	...	165
Avg.	...	176	...	187	...	160

Federal Reserve Board

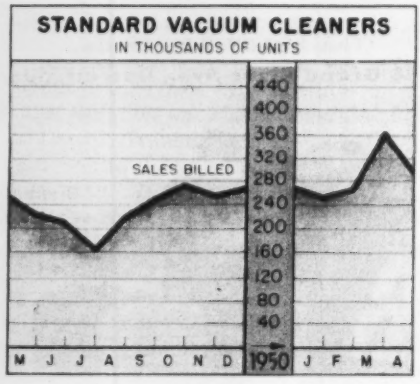


Gear Sales Index

1935—1939=100

	1950	1949	1948
January	280.2	320.7	346.8
February	272.9	282.3	324.4
March	358.4	299.1	389.8
April	328.6	339.0	320.9
May	....	250.1	283.6
June	....	227.8	324.1
July	....	193.1	384.4
August	....	262.0	335.6
September	....	224.9	320.4
October	....	242.3	333.3
November	....	230.7	309.0
December	....	242.8	325.9

American Gear Mfrs. Assoc.



Standard Vacuum Cleaners

Sales Billed—Units

	1950	1949	1948
Jan.	249,150	228,769	304,273
Feb.	263,515	241,267	311,448
Mar.	361,014	309,897	355,415
Apr.	292,664	252,656	306,588
May	.....	222,850	276,657
June	.....	207,354	256,071
July	.....	161,920	229,537
Aug.	.....	219,909	237,202
Sept.	.....	250,036	280,084
Oct.	.....	272,520	281,573
Nov.	.....	253,516	255,080
Dec.	.....	265,513	273,890
Total	.....	2,886,514	3,360,859

Vacuum Cleaner Manufacturers Assoc.

Issue Dates of Other FACTS and FIGURES Published by STEEL:

Constr. Valuation ..May22	Mall. Iron Cast ...May22	Ranges, Gas May29
Fab. Struc. Steel..May8	Metalwork. Wages..May22	Refrigerators May29
Fdry. Equip. Orders..May15	Metalwork. Employ..May22	Steel Cast. May29
Freight Cars May15	Price Indexes May1	Steel Employment..May22
Furnaces, W. Air..May8	Pumps, Orders May1	Steel Shipments ..May22
Ind. Fur. Orders...May15	Purchasing Power ..May8	Trucks, Elec. Ind...Jan.2
Ironer Sales May15	Radio, TV Output..May15	Washer Output May15
Machine Tools May29	Ranges, Elec. May29	Water Heaters May29

FRB Index Advances

Another 2 point rise in the Federal Reserve Board's industrial production index was recorded in April and a similar increase is expected in May. The board's economists note a generally favorable picture in manufacturing and construction. There is a strong possibility that June's figure will reach a peacetime high. The index was 189 per cent of the 1935-1939 average in April, only 6 points below the postwar high attained in late 1948.

Big gains in iron and steel output, automobiles and the machinery industry were the chief reasons why April's index topped the total for the preceding month. Production of other durables and most nondurables continued good during the month. Mineral production which declined slightly in April recovered in the early part of May.

The Commerce Department reports, however, that manufacturers' sales in April dropped 5 per cent below those in March, after adjustment for seasonal factors, and new orders to manufacturers slipped 10 per cent. As the result of the two declines, inventories increased and unfilled orders dropped slightly.

Vacuum Cleaner Sales Dip

Although household vacuum cleaner factory sales in April were down 18.9 per cent from the total for the preceding month they were 15.8 per cent higher than in the like month a year ago. Vacuum Cleaner Manufacturers' Association reports April sales totaled 292,664 standard-size units, compared with 361,014 in March and 252,656 in April, 1949.

Sales in the first four months this year were 12.9 per cent above those in the same 1949 period. The four-month total this year is 1,166,343 units. In the corresponding 1949 period 1,032,896 cleaners were sold.

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The Business Trend

Automotive and steel industries are setting new output records as production indexes rise to dizzy heights. June should be a record month for industry

SPEARHEADED by an amazing production record on the part of the automotive and steel industries, metalworking is setting a blistering pace for other industries to follow. Previously predicted output ceilings and "never to be reached again" marks set earlier in the postwar period have been shattered in recent weeks and the new records may not have a very long life.

Sometime this month the crest in industrial activity is expected to pass and July should find some easing in the industrial pace. The reason July's output is not expected to match that for June is many plants will shut down during that month for vacation periods. This mass vacation plan which has gained in popularity since the war is expected to affect more companies this year than ever before. Demand is so high in some industries that employees are offered vacation pay in lieu of vacations.

There are no major labor clouds on the horizon. A period of industrial peace should provide the answer to the question whether the present high level output is due to strike-induced shortages or strong, unsatisfied demand.

Should demand slip later this year, there is less likelihood of big price cuts to bring buyers into the market. Raw material prices are edging upward and labor costs keep on rising. Consumer goods have not advanced but increases in many lines are expected in the second half.

Industrial Production . . .

While there is much speculation about the future, the present is taking good care of itself. In the week ended May 27, STEEL's industrial production index took another long step upward to a preliminary 209 per cent of the 1936-1939 average. The latest total represents a 4 point jump from the revised total for the preceding week and sets another weekly output record. Automobiles and steel provided the muscle that made the advance possible.

Automobiles . . .

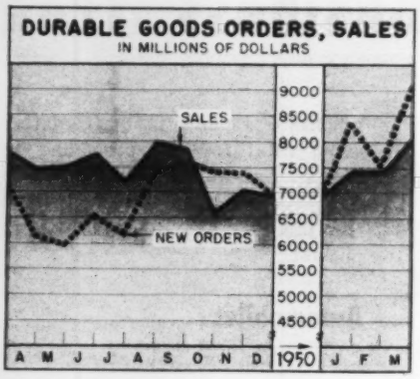
The man on the street whistles with amazement when he learns the automotive industry's weekly output total and wonders where all the passenger cars and trucks are going. Many metalworking executives also share this wonder because the output in recent weeks is little short of fantastic and there is no sign of a letup. Outturn by U. S. and Canadian plants in the week ended May 27 was 183,670 passenger cars and trucks, outstripping the previous record set just one week earlier by more than 8000 units.

Steelmaking . . .

While the automobile production record was being set, the steel industry chalked up one of its own in the week ended May 27. Steelmaking furnaces were operated at

BAROMETERS of BUSINESS

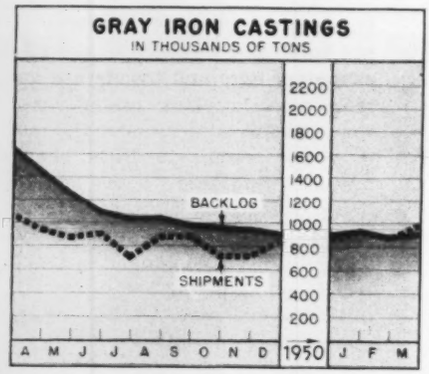
		LATEST PERIOD*	PRIOR WEEK	MONTH AGO	YEAR AGO
INDUSTRY	Steel Ingot Output (per cent of capacity)†	101.5	101.0	100.5	94.5
	Electric Power Distributed (million kilowatt hours)	5,894	5,845	5,902	5,270
	Bituminous Coal Production (daily av.—1000 tons)	1,591	1,662	1,856	1,869
	Petroleum Production (daily av.—1000 bbl.)	5,115‡	5,118	5,015	4,957
	Construction Volume (ENR—Unit $1,000,000)	$291.2	$206.0	$219.1	$173.7
	Automobile and Truck Output (Ward's—number units)	183,670	175,314	148,274	117,703
	* Dates on request. † 1950 weekly capacity is 1,906,267 net tons. 1949 weekly capacity was 1,843,516 net tons. Preliminary.				
TRADE	Freight Car Loadings (Unit—1000 cars)	748†	743	745	785
	Business Failures (Dun & Bradstreet, number)	214	199	186	206
	Money in Circulation (in millions of dollars)‡	$26,908	$26,980	$26,967	$27,367
	Department Store Sales (changes from like wk. a yr. ago)‡	−2%	+8%	+5%	−5%
	† Preliminary. ‡ Federal Reserve Board.				
FINANCE	Bank Clearings (Dun & Bradstreet—millions)	$14,041	$13,818	$13,441	$12,727
	Federal Gross Debt (billions)	$256.1	$256.0	$255.6	$251.7
	Bond Volume, NYSE (millions)	$18.4	$21.7	$19.4	$13.9
	Stocks Sales, NYSE (thousands of shares)	8,201	9,752	11,433	3,836
	Loans and Investments (billions)†	$66.7	$66.4	$66.7	$62.2
	United States Gov't. Obligations Held (millions)†	$36,257	$35,899	$36,177	$33,872
	† Member banks, Federal Reserve System.				
PRICES	STEEL's Weighted Finished Steel Price Index††	156.13	156.13	156.13	152.90
	STEEL's Nonferrous Metal Composite‡	173.9	172.7	163.6	176.1
	All Commodities†	156.1	155.9	153.7	156.0
	Metals and Metal Products†	171.0	170.3	170.1	167.8
	† Bureau of Labor Statistics Index, 1926 = 100. ‡ 1936-1939 = 100. †† 1935-1939 = 100.				



Durable Goods Orders, Sales
In Millions of Dollars

	New Orders 1950	New Orders 1949	Sales* 1950	Sales* 1949
Jan.	8,377	6,706	7,471	7,550
Feb.	7,513	6,734	7,461	7,757
Mar.	9,113	7,185	8,057	7,805
Apr.	....	6,127	....	7,445
May	....	5,993	....	7,488
June	....	6,544	....	7,745
July	....	6,195	....	7,207
Aug.	....	7,407	....	7,982
Sept.	....	7,634	....	7,877
Oct.	....	7,432	....	6,542
Nov.	....	7,402	....	7,041
Dec.	....	7,019	....	6,960

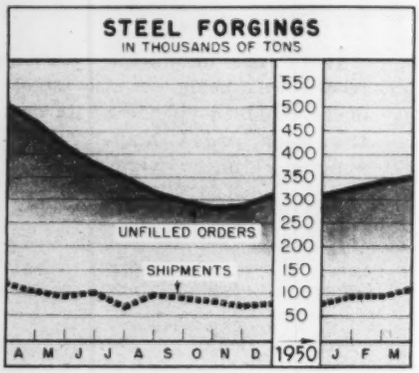
* Seasonally adjusted. U. S. Office of Business Economics



Gray Iron Castings
Thousands of Net Tons

	Shipments 1950	Shipments 1949	Backlogs* 1950	Backlogs* 1949
Jan.	913	1,040	914	2,065
Feb.	864	987	873	1,857
Mar.	996	1,075	922	1,639
Apr.	...	929	...	1,446
May	...	867	...	1,243
June	...	906	...	1,087
July	...	697	...	1,032
Aug.	...	872	...	1,048
Sept.	...	881	...	980
Oct.	...	716	...	955
Nov.	...	719	...	939
Dec.	...	862	...	892
Total	...	10,551		

*For Sale. Bureau of the Census



Steel Forgings
Thousands of Tons

	Shipments 1950	Shipments 1949	Unfilled Orders* 1950	Unfilled Orders* 1949
Jan.	93	124	327	571
Feb.	93	111	341	540
Mar.	109	120	350	503
Apr.	..	104	...	465
May	..	92	...	412
June	..	101	...	377
July	..	70	...	348
Aug.	..	96	...	312
Sept.	..	88	...	294
Oct.	..	81	...	280
Nov.	..	73	...	287
Dec.	..	78	...	308

* For Sale. Bureau of the Census

Charts—Copyright, 1950, STEEL

101.5 per cent of capacity that week and virtually the same rate was maintained last week despite the holiday. Finishing mills, of course, did not roll on the holiday.

Bituminous Coal . . .

The decline in bituminous coal output continued through the week ended May 20. In that week 9,545,000 tons were produced. Some of the drop was by unavailability of coal cars due to the railroad tie-up. Bituminous coal output through May 20 was 172.3 million tons.

Prices . . .

Wholesale prices continue their slow advance. The Bureau of Labor Statistics wholesale price index rose 0.1 per cent in the week ended May 23 to 156.1 per cent of the 1926 average. The latest figure is 0.1 per cent higher than a year earlier and reflects increases in a majority of its subgroups. STEEL'S nonferrous metals index made its eighth consecutive weekly advance in the week ended May 27 and reached 173.9 per cent of the 1936-1939 average.

Construction . . .

Heavy engineering contracts totaled $291.2 million in the week ended May 25 and brought the cumulative total for 1950 to $4411 million. The latest weekly total is 38 per cent above the average week thus far in 1950 and 67 per cent above the like week a year ago. The cumulative total tops that for the like 1949 period by 44 per cent.

No Room for Gloom

Household appliance makers will have a first half output volume well above 1949

APPLIANCE business in the first half will be little short of sensational. Although some easing from the rapid assembly pace of the first few months is expected in all segments of the appliance industry, the decline will not be severe and appliances as a whole should attain a first half volume about half again as large as in the same period a year ago.

Automatic gas water heater outturn continued to climb in April and reached an alltime high of 176,700 units. April shipments brought the four-month total compiled by Gas Appliance Manufacturers Association to 639,800 units or 62.3 per cent more than in the like 1949 period.

Stove Shipments Boom—Gas range shipments posted the best April mark on record (see below) although they were slightly below the March total. Electric range sales in the first three months were almost 29 per cent higher than in the corresponding period a year ago. They totaled 362,331 units in the first quarter.

Sales of electric household refrigerators aggregated 1,423,405 units in the first quarter and topped the total for the first three months in 1949 by 23 per cent.

TV in Stratosphere — The largest gains percentagewise are being recorded by television manufacturers. April's 420,026 receivers produced are more than two and one-half times the total in the same month last year. The 1,647,956 set outturn in the first four months exceeds the like year ago total by 180 per cent. Even radio manufacture is running well ahead of a year ago, indicating that those who were sounding its death knell were a little premature. Home and auto radio production in the first four months was 3,273,658 units or 65 per cent above the like 1949 total.

For a Cleaner Nation — Washer, dryer and ironer sales likewise are showing their heels to year ago totals. Totals compiled by the American Home Laundry Manufacturers' Association show the following four-month totals and percentages over 1949: 1,375,417 washers, 70 per cent; 91,149 dryers, 187 per cent; 117,300 ironers, 19 per cent.

Gas Range Shipments Rise

Total industry shipments of domestic gas ranges are estimated at 888,000 units during the first four months of 1950, says Gas Appliance

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Manufacturers Association Inc. That is 68.8 per cent over the 526,000 units shipped during the same period last year and practically doubles the prewar average (1936-1940) shipments of 448,700 units for the period.

In the alltime peak year of 1948, 948,600 domestic gas ranges were shipped in the first four months of the year.

Preliminary April figures show that the estimated 246,000 units shipped then set an alltime record for the month. The previous best April was in 1948.

In the first quarter, gas range shipments jumped by 70.8 per cent compared with first period shipments in 1949. Electric range shipments jumped 23.4 per cent.

Refrigeration Payrolls Grow

An additional 31,000 workers were hired by the refrigeration and air conditioning industry between December, 1949, and March, bringing employment to slightly more than 100,000. This figure is still about 2000 less than in March, 1949, says the Bureau of Labor Statistics, but higher output has been achieved by the industry through longer workweeks.

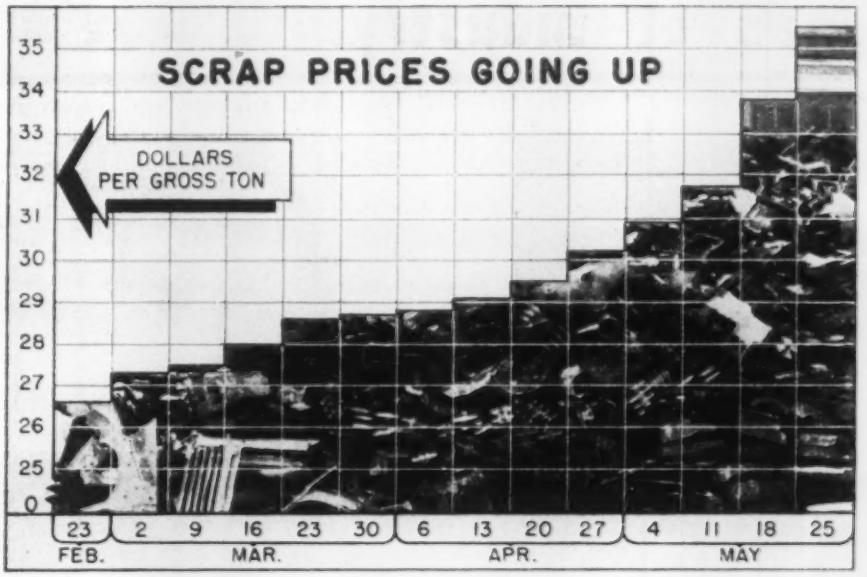
Although a decline in refrigerator output as compared to the first quarter is generally expected, an employment drop is unlikely because any curtailment probably can be absorbed by reducing overtime. Household refrigerator output in March set a new monthly record 25 per cent above the previous high posted in April, 1941, but commercial refrigeration and air conditioning volume dipped below the year ago total.

Earnings Reach Record High

Production workers' weekly earnings rose to a new record of $56.89 in mid-April, says the Bureau of Labor Statistics. This figure represents the fifth consecutive monthly rise in production workers' wages and is up more than $3 over April a year ago. In March, 1950, it was $56.53.

Longer work-weeks in the metal, machinery, automobile and home building industries caused the rise. Gains in these industries were offset by seasonal reduction in hours in the soft goods industries so the average weekly hours worked were unchanged from March's 39.7 hours.

Primary metals industries increased their average weekly hours from 38.9 in March to 40.4 in April while transportation equipment hours rose from 40.2 to 42.



RCA To Boost Radio, TV Output

An expansion of its radio and television production facilities will soon get under way at plants of RCA Victor Division of Radio Corp. of America.

Plans call for a switch of most of its radio and radio-phonograph production from Bloomington, Ind., to Canonsburg, Pa., to permit increased television output. Henry G. Baker, vice president and general manager of the home instrument department, expects television demand to "exceed by a wide margin even the tremendous receiver volume experienced in 1949." The Bloomington plant will be devoted exclusively to television production before the end of the year.

The recently leased Canonsburg plant will be equipped for conveyor-line operations to assemble 1 million radio and radio-phonograph units a year. Production will begin about Aug. 1. Eventually, all of RCA's radio sets will be made there.

Reliance Backlogs Rising

Reliance Electric & Engineering Co.'s backlog of firm orders is now $6,880,000 compared with $5,050,000 a year ago, reports J. W. Corey, president of the Cleveland firm. Amount of business entered in the last six months exceeds the year ago total by 40 per cent, Mr. Corey explains, and orders are coming in at a high rate.

Backlogs have grown to the current figure from a $3.7 million low reached during the steel and coal strikes. The company's manufacturing department is increasing its shipments monthly and facilities added since the war are adequate to handle efficiently any foreseeable increase in volume.

Will Steel Go Up?

Scrap costs more, and so will finished steel if the present trend continues

STEELMAKING scrap prices have climbed nearly 30 per cent in a steady weekly rise since Mar. 2 (see the chart).

STEEL's scrap composite stood at $27.33 Mar. 2; by the week ended May 25 it had jumped $8.17 to $35.50. In May, 1949, the composite stood at $22.29. On an average monthly basis, scrap prices have been rising since January. Then, the composite average was $26.39; $27.52 in February; $28.23 in March; and $29.40 in April. The highest postwar scrap composite reached $43.33 in August and September, 1948.

The Shape of Things To Come—Are steelmakers' costs affected by the rising scrap prices? Probably not much—yet. Some of the price advance thus far represents scrap brokers' activity in buying to cover old contracts with steel companies at around $30. But steelmakers will have to negotiate new scrap contracts eventually. Chances are the new prices will be nearer $40 than $30. Thus, steelmaking costs will go up, and perhaps finished steel prices, too.

The basic reason for the rise in scrap prices is the high steelmaking rate of over 101 per cent of capacity. Coupled with that is an active conversion market which is using a lot of scrap. The old practice of earmarking the material—whereby steel consumers agree to send their scrap to their steel producers—is returning despite efforts to forestall it.

Men of Industry

PARK Q. WRAY
. . . heads sales, National Motor Bearing

Park Q. Wray, manager, replacement sales division, **National Motor Bearing Co. Inc.,** Redwood City, Calif., becomes director of sales for NMB and its two subsidiaries, Arrowhead Rubber Co. and National Seal Co. **E. F. Riesing,** for 17 years a sales executive, automotive parts division, Firestone Tire & Rubber Co., has joined the company as sales manager, industrial division. He will have headquarters at the Detroit office. **Park Q. Wray Jr.,** for some time in charge of the northern California sales territory, replacement division, was promoted to sales manager of that division.

Granite City Steel Co., Granite City, Ill., re-elected **John N. Marshall** as chairman of the board and also elected him as president to succeed **N. B. Randolph,** who retires due to ill health. **George B. Schierberg,** executive vice president and secretary-treasurer, was elected a member of the executive committee to succeed Mr. Randolph.

G. A. Dies was appointed assistant to the sales manager, metal division, **National Lead Co.'s** St. Louis branch. He was order department supervisor, metal sales, St. Louis.

Joseph W. Wieger was appointed chief product engineer, **Midvale Co.,** Philadelphia.

National Electric Products Corp., Pittsburgh, has created in its sales organization a southeastern region, and named **Walter J. Barnes** regional manager. Mr. Barnes was manager of the Atlanta district sales office, and will maintain headquarters there.

F. H. KILBERRY
. . . management consultant, Superior Engine

F. H. Kilberry was appointed management consultant in charge of **Superior Engine Division,** National Supply Co., at Springfield, O. He will have charge of all activities of the division. Until recently Mr. Kilberry was executive vice president, Nordberg Mfg. Co., Milwaukee. From 1929 to 1945 he was with Atlas Imperial Diesel Engine Co., Oakland, Calif., and president for six years.

John A. Coakley Jr. was named to succeed his father, the late **John A. Coakley,** as president, **Automatic Sprinkler Corp. of America,** Youngstown, and will continue as treasurer of the company. He also assumes the office of president and treasurer of Automatic Finance Co., as well as a directorship in the Cleveland Stevedore Co. **John J. Power Jr.** was elected executive vice president, Automatic Sprinkler, and will also serve as president of subsidiary company, Automatic Sprinkler Co. of Canada Ltd., and vice president and assistant treasurer, Automatic Finance Co., of which **William D. Coakley** was elected a director. **R. W. Higginson** of Montreal was made a director of the Canadian subsidiary.

The following committee chairmen of the **Industrial Furnace Manufacturers Association** were appointed at its 20th annual meeting: Combustion equipment, **J. H. Sands,** sales manager, Eclipse Fuel Engineering Co., Rockford, Ill.; fuel-fired furnaces, **C. H. Vaughan,** treasurer and general manager, The Electric Furnace Co., Salem, O.; electric furnaces, **L. H. Gillette,** manager, heating section sales, Westinghouse Electric Corp., Meadville, Pa.

T. C. FOGARTY
. . . Continental Can division exec. V. P.

T. C. Fogarty, vice president of sales, was elected executive vice president of the metal division, **Continental Can Co. Inc.,** New York. Promoted to newly created posts of division vice presidents are **Reuben L. Perin,** eastern division; **William M. Cameron,** central division; and **Sherlock McKewen,** Pacific division. **Loren R. Dodson** was elected secretary and treasurer. **Harry A. Rapelye** was promoted from vice president to president of the subsidiary company, Continental Can Co. of Canada Ltd.

American Society for Metals, Cleveland, named the following to serve as officials and trustees for 1950-51: As president, **Walter E. Jominy,** Chrysler Corp.; vice president, **Dr. John Chipman,** Massachusetts Institute of Technology; secretary, **W. H. Eisenman;** treasurer, **Ralph L. Wilson,** Timken Steel & Tube Co.; new trustees, **J. B. Austin,** U. S. Steel Corp., research laboratories, and **Dr. James T. MacKenzie,** American Cast Iron Pipe Co. In addition the following serve as trustees: **Elmer Gammeter,** Globe Steel Tubes Co.; **Thomas G. Digges,** National Bureau of Standards; **Arthur E. Focke,** Diamond Chain Co.; and Messrs. Jominy, Chipman, Eisenman and Wilson.

George Skipton, application engineer for the transportation division, **Westinghouse Electric Corp.** in San Francisco, was placed in charge of all company activities relative to supplying electrical apparatus to the city and county of San Francisco.

W. R. Bennett, vice president, Illinois National Bank & Trust Co., Chicago, was added to the board of directors.

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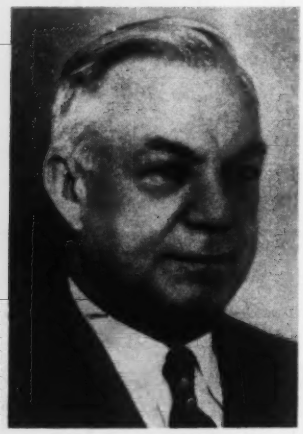
A-1924

Perfection Stove Co., Cleveland. **George McCuskey**, legal counsel for the company, was named assistant treasurer.

Farrel-Birmingham Co. Inc. appointed **Carl F. Schnuck** as director of engineering, and **Warren C. Whittum** as chief engineer. In his new post Mr. Schnuck, who recently completed 50 years with the company, will be permitted more time to guide the overall engineering policies of the company, with particular emphasis on development of new and improved machinery. The responsibilities of directing engineering operations and engineering personnel are now assumed by Mr. Whittum.



CARL F. SCHNUCK
. . . *heads engineering, Farrel-Birmingham*

Elected directors of **Philco Corp.**, Philadelphia, are **William H. Chaffee**, vice president and director of purchases, and **John M. Otter**, vice president and general sales manager, increasing the board from 15 to 17.

Paul C. Hurley Jr. was appointed manager of a newly-created sales promotion department, **Pennsylvania Salt Mfg. Co.**, Philadelphia. He will head advertising, promotion research and salesmen-training program.

American Society of Tool Engineers, Detroit, elected the following as directors: **H. L. Tigges**, executive vice president, Baker Bros., Toledo, O.; **L. B. Bellamy**, Sterling Grinding Wheel Co., Detroit; **J. T. Crosby**, vice president, Lapointe Machine Tool Co., Hudson, Mass.; **J. J. Demuth**, methods engineer and general superintendent, Sligo Inc., St. Louis; **T. J. Donovan Jr.**, president, T. J. Donovan Co., Philadelphia; **R. B. Douglas**, president, Godscroft Industries, Montreal; **V. H. Ericson**, president, Johnson DeVou Inc., Worcester, Mass.; **E. W. Ernst**, superintendent of punching tool and die division, General Electric Co., Schenectady, N. Y.; **B. J. Hazewinkel**, L. S. Starrett Co., Denver; **A. D. Lewis**, manager, Art Lewis Production Equipment Co., Glendale, Calif.; and **Fred J. Schmitt**, director, D. A. Stuart Oil Co. Ltd.

John W. Miller was elected to the board of directors, **American Hydraulics Inc.**, Sheboygan, Wis. He has been with the firm as sales manager since early 1949, handling products of the firm and its subsidiary, Luther Grinder & Tool Co.

E. C. Manix was named general sales manager, **Nichols Wire & Aluminum Co.**, Davenport, Iowa. He was sales manager of the eastern division.

Elmer F. Twyman was elected vice president in charge of the Philadelphia division of **Yale & Towne Mfg. Co.**, New York. He succeeds **James C. Morgan** on June 15 when Mr. Morgan retires under the company's pension plan. Mr. Twyman has had many years' experience in the materials handling field, including 15 years as general manager of the Automatic Transportation Co., division of Yale & Towne in Chicago. **John A. Baldinger**, assistant general manager at Automatic, will transfer June 15 to the Philadelphia division, when he becomes assistant general manager at the Philadelphia plant. **Lawrence J. Kline** succeeds Mr. Twyman as general manager of Automatic. He joined that company earlier this year as sales manager, after association with Mercury Mfg. Co.

ELMER F. TWYMAN
. . . *Yale & Towne V. P. at Philadelphia*

Eastern Enamelers Club, Baltimore, elected as new officers **Clay Ellinger**, Philco Corp., president; and **William Paul**, Harry Weiskettel Co., vice president. **G. H. Spencer-Strong** and **Howard Williams** were re-elected to the respective offices of treasurer and secretary. Retiring officers are **Nathan R. Klein**, Caloric Stove Corp., as president; and **James Cahill**, Youngstown Sheet & Tube Co., as vice president.

George W. Anselman has joined **Beloit Foundry Co.**, Beloit, Wis., as foundry and sales engineer. For the last year and a half foundry superintendent, Woodruff & Edwards Inc., Elgin, Ill., he formerly was service engineer, Goebig Mineral Supply Co., Chicago.

Alfred A. Diebold, works manager, Atlas Steel Casting Co., Buffalo, was installed as chairman, Western New York Chapter, **American Foundrymen's Society.**

R. R. Rolph was appointed Detroit sales representative, **Warner Gear Division**, Borg-Warner Corp.

Leo J. Dornbos was appointed to the field engineeering staff, **Sprague Electric Co.**, N. Adams, Mass.

W. Ray Kern was named sales manager, **Winslow Engineering Co.**, Oakland, Calif.

Al Graebner has joined **Fahralloy Co.**, Harvey, Ill., as a sales engineer. He formerly headed the Graebner Engineering Co., Chicago.

H. Ward Zimmer was elected executive vice president, **Sylvania Electric Products Inc.**, New York. He has been vice president-operations for the last two and a half years, and was elected to the board of directors last April.

H. WARD ZIMMER
. . . *exec. vice president at Sylvania*

New Britain Machine Co., New Britain, Conn., appointed **Al LeBrun** as Connecticut sales engineering rep-

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A. S. JOHNSON
. . . National Carbon gen. manager

GORDON R. ANDERSON
. . . Freeport gen. mgr., Fairbanks, Morse

GEORGE E. SHAFER
. . . chief engineer, Armco subsidiary

resentative, Lucas Division, to handle sales and service for Lucas horizontal boring, drilling and milling machines.

A. S. Johnson was appointed general manager, **National Carbon Division,** Union Carbide & Carbon Corp., New York. With the organization over 20 years, he became assistant to the vice president of production, with offices in Cleveland, in 1944, was transferred in 1945 to the foreign department in New York, and in 1948 was made a vice president.

Roland W. Burt was appointed sales manager, Chicago plant, **Joseph T. Ryerson & Son Inc.** He succeeds **Thomas Z. Hayward,** former assistant general manager of sales and acting sales manager of the Chicago plant, who was promoted to general manager of sales.

Midwest Research Institute, Kansas City, Mo., elected **Charles N. Kimball** as president. Other officers of the institute are **George E. Ziegler,** director of research; **Leon T. Swan,** vice president and treasurer; **S. C. Lechtman,** secretary; and **V. L. Barnett,** assistant treasurer.

Gordon R. Anderson was appointed general manager, Freeport Works, Freeport, Ill., **Fairbanks, Morse & Co.** He succeeds **Lee Madden,** retired. Associated with the company since 1922, Mr. Anderson became manager of engineering in 1946. He is succeeded by **J. F. Weiffenbach,** former chief engineer, diesel locomotive division, who will retain his headquarters at Beloit, Wis. **Donald L. Harwood** was appointed purchasing agent of the company.

Charles E. Kaufman, assistant director of research, **Hall Laboratories Inc.,** Pittsburgh, was named director of research to succeed **Dr. Everett P. Partridge,** who recently became director of Hall Laboratories.

James M. Garvey, vice president and general manager, was elected president, **American Laundry Machinery Co.,** Norwood, O., succeeding the late **Harvey H. Miller. J. F. Allen,** treasurer, was named a vice president. **John B. Patzold** was appointed purchasing agent, succeeding the late **J. W. Kinney.**

George E. Shafer was appointed chief engineer, **Armco Drainage & Metal Products Inc.,** subsidiary, Armco Steel Corp., Middletown, O., and will continue in charge of its sales engineering department. In addition he will assume responsibility for two other departments: Product engineering and new product development. This change of organization was occasioned by retirement of **Carleton C. Clark,** manager, fabricated products engineering department, and **John R. Wilks,** manager, new product development.

Newly appointed president of **Hydraulic Press Mfg. Co.,** Mt. Gilead, O., is **John C. Cotner.** Acting as vice president and general manager, later as president, Logansport Machine Co. Inc., Logansport, Ind., Mr. Cotner accumulated a 20-year experience in sales and production of hydraulic presses, cylinders, valves and power units. During 1945-46 he served as vice president, Gerotor May Inc., Baltimore, and as president, Consolidated Industries Inc., Lafayette, Ind., in 1949. Mr. Cotner's appointment became effective on May 1.

OBITUARIES . . .

Edward B. Heyden, 52, head of **Graver Construction Co.** and vice president of **Graver Tank & Mfg. Co. Inc.,** E. Chicago, Ind., died at his home in Cranford, N. J., in April.

Harry P. Hubbell, chairman of the board of directors, and founder of **Brass & Copper Sales Co.,** St. Louis, president of Semi-Steel Casting Co. and senior partner in Hubbell & Co., died May 17.

Walter C. Wassman, 55, and his son, **Walter G. Wassman,** 26, were drowned in the Des Plaines river when the flat bottomed boat in which they were riding capsized in turbulent water. The elder Mr. Wassman was manager, and his son was vice president of **George L. Detterbeck Co. Inc.,** Chicago.

Frank R. Pierce, president, **Dearborn Motors,** Detroit, died in a Charlotte, N. C., hospital May 25 of injuries suffered in a plane crash.

Willis F. Washburn, 64, director of the titanium division, **National Lead Co.,** New York, died May 24 in Waterville, Me.

Thomas S. Waddington, 68, a retired power supervisor, Chambers Works, **E. I. du Pont de Nemours & Co. Inc.,** Wilmington, Del., died May 21 in the Salem County Memorial Hospital, Carney's Point, N. J.

Harry Topkis, 65, president, **Delaware Hardware Co.,** Wilmington, Del., died May 21.

William D. Disston, 62, retired vice president, **Henry Disston & Sons Inc.,** Philadelphia, died May 22 at his home, Chestnut Hill, Pa.

Frank X. Hamberger, 72, president, **Hamberger & Co. Inc.,** Buffalo, manufacturer of gas heaters, died May 22.

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Production AND Engineering
NEWS AT A GLANCE

MAKES FAST TAPER CHECKS—Any standard taper up to No. 50 milling machine taper, plus any special one in that size range can be measured accurately in two minutes by a fixture developed by Webber Gage Co., Cleveland. The company says the unit eliminates cross checking, comparing and reconciling differences that sometimes arise with conventional methods. Measuring technique involves assembling the proper combination of angle blocks, then mounting the blocks with the work on the fixture for an indicator reading. Accuracy is within 0.000020-inch in 4 inches.

TO BOOST GENERATOR SIZE—Bigger electric generators may be in the offing due to development of a radically new electrical insulation. According to Graham Lee Moses, manager, Westinghouse Electric Corp. development insulation section, East Pittsburgh, Pa., tests indicate life of the new material to be at least ten times as great as previous insulations under conditions of severe electrical stress. New insulation, referred to as Thermalastic, consists of mica flakes embedded in tough, heat resistant synthetic resin with sufficient stretch at operating temperatures to expand and contract with the generator coils. At 100° C, it has 30 times the tensile strength of conventional insulation. Currently it is being used on all large Westinghouse steam-turbine generators.

PETCOCK WITH A "BRAIN"— A 2-inch mechanical "midget" weighing only 3½ ounces, developed by Master Equipment Corp., Dayton, O., can save many headaches for companies using air lines and compressors. Operating on the build up and relief of pressure, the unit automatically ejects all water and oil twice for each operation of the equipment. It also can be adapted to automotive air brake systems.

THREE-PRONGED INVESTIGATION— Machine screws are the most common and most satisfactory removable fastening means in industry. But for each application, according to A. C. Millard of Bell Telephone Laboratories, the design engineer should know the load the screw must withstand, whether the loading is one of tension or shear, and whether the screw assembly is to be subjected to impact shock. Once these factors are determined, he says, size of the screw, material from which it is to be made and class of thread fit present no problems. In an article in *Fasteners*, he includes several curves which indicate correct tightening torques for machine screws employed in common industrial applications.

MEASURES HIGH TEMPERATURES— Measurement of very high temperatures—up to 7000° F—is facilitated by a device developed by Brown instrument division, Minneapolis-Honeywell Regulator Co. Designed for sighting on relatively small targets, the instrument can also be used for nuclear work and in atomic energy projects. It consists of a lens which focuses the hot target and a thermopile that receives the radiant energy. Amount of radiant energy received by the latter determines temperature to which the hot junction will rise. Temperature of the hot object can be constantly indicated or recorded by a continuing series of determinations and evaluations.

REDESIGNING HELPS — Although redesigning a product may not always be the answer in solving problems, it does help in a majority of the cases. A heavy weight steam turbine unit, for example, represented a very complicated and intricate one-piece casting when produced to specification. It was difficult to cast soundly in one piece even under perfect control conditions, overly expensive in as-cast form and required costly finishing. By redesigning and converting to cast weld construction the whole chore was made easier. In the long run, it was cheaper to produce in spite of the fact cost of the cast weld assembly was higher. (p. 92)

EVERY PAIR PERFECT—Matching of mating cages for planetary gears is insured in Packard's Ultramatic drive by machining the parts with the same tools in a multiple indexing machine. Cages are loaded in pairs in alternate fixtures on the circular indexing table of the machine. Machine on which work is performed includes three heads, each with multiple spindles. The heads are not fixed but are given a compound motion by a cam that brings the corresponding tools into correct position for making their respective cuts. (p. 94)

NO LINE DELAYS—Chamfering and threading machines at National Tube Co. are arranged so that either spindle can be operated independently. Setup enables the operator to change tools or make repairs and adjustments on one spindle at a time without stopping the entire line. Both machines also can be operated independently in event only one of the operations is desired. Versatility of operations is entirely automatic being controlled through selector switches. (p. 95)

MACHINABILITY HIGH — Because malleable iron is the most machinable and free cutting of ferrous metals of comparable or higher strength explains why large use of malleable is made in the automotive industry. Its high machinability is due to its uniformity of structure, and its nodular temper carbon which serves as a lubricant on the cutting point of the tool. Formation of chips which break up without creating undue pressure on the top face of the tool avoids generation of high heat, helping to expand tool life. (p.106)

Fig. 1—Redesigned cylinder casting unit, cope side down, with oblong valve chest seat ready to receive valve chest

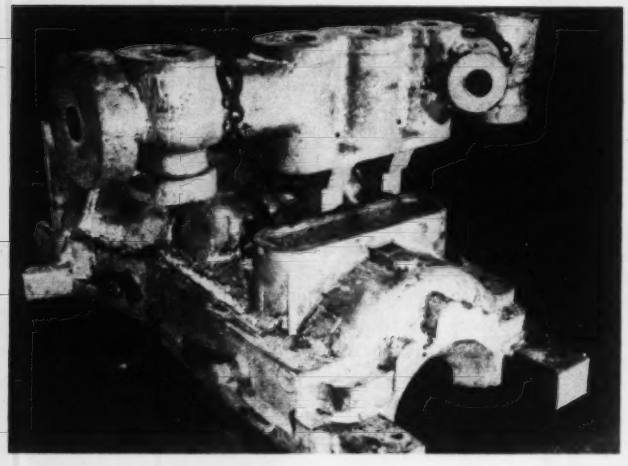


Fig. 2—Ponderous valve chest being lowered into place, prior to welding

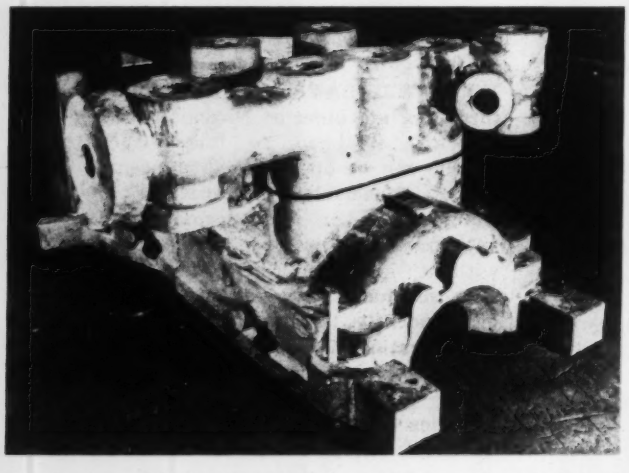
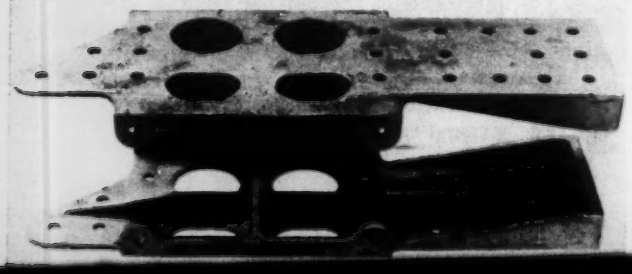


Fig. 3—Assembled units ready for welding. Figs. 1, 2 and 3 courtesy Falk Corp.

Fig. 4—Freight car center filler. This is a three-piece cast-weld assembly, ready for application by welding or riveting to car center sills. Courtesy Symington-Gould Corp.



REDESIGNS

AN UNDERLYING principle of intensive product development activities in the steel casting industry is that seldom can any structure be considered to be so perfectly designed that further improvement is impossible. Paramount importance of correct design is recognized, both from the viewpoint of service satisfaction and economic production; and the field of steel casting applications is being progressively expanded on a realistic basis as designers and foundry engineers approach better understanding of respective problems, and adjust the objectives of one to the facilities and techniques of the other.

This engineering teamwork consideration represents a primary approach motivating the practical research and development program of Steel Founders' Society of America. It is a guiding force behind current large-scale redesign undertakings aimed at achieving lower production costs, improved castability, better appearance, reduced weight and other benefits in engineered structures which still embody the necessary characteristics of quality, utility and essential strength.

Such restudy of existing designs, typical of cost-conscious manufacturing industry today, often leads to distinct improvements and enhanced price factors beneficial to both manufacturer and supplier. This is true whether the aim is to substitute a casting for a weldment, weldment for casting, simply to improve a basic casting design, or to seek essential improvements via redesign of a forging, bolted or riveted plate structure, or composite fabrication, or possibly redesign of castings for conversion to cast-weld construction.

Turbine Casting Problem—What is considered an exceptional example of the latter type of conversion redesign developed in the Steel Founders' Society program is shown in Figs. 1, 2 and 3 illustrating a complex cast-weld conversion project successfully carried out by Falk Corp., Milwaukee.

The problem was one of redesigning a massive, heavy-weight steam turbine unit originally produced to specification as a very complicated and intricate one-piece steel casting. As such, it was difficult to cast soundly in one piece even under perfect control conditions, overly expensive in as-cast form, and requiring subsequent costly finishing, time-consuming weld and reweld operations. Decision to redesign and convert to cast-weld construction, supplanting the highly intricate one-piece casting with a separately cast steel cylinder casting and a valve chest part, joined with a single weld, brought a solution satisfactory to the foundry and its customer.

Fig. 1 shows the redesigned cylinder casting unit, cope side down, with the oblong valve chest seat ready to receive the valve chest. Fig. 2 shows the ponderous valve chest being lowered into place, prior to welding; and Fig. 3 shows the assembled units, ready

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STEEL CASTINGS

to achieve lower production costs, improved castability, better appearance, reduced weight

for welding. Foot-rule at bottom left of cylinder casting gives comparative idea of size. The finished assembly weighs more than 14 tons.

Complex Design—In years past, one of the Falk foundry engineers explained, steam turbine castings were relatively simple in design and comprised a very desirable type of steel casting order. "Then, designers began to 'hang on everything but the kitchen sink', and ensuing production problems reached the stage where even the most competent foundries found it extremely difficult to produce perfectly sound castings, due to the compounded handicaps encountered in adequately risering a particularly intricate and complicated part. Rework and back charges became an unavoidable corollary of virtually every steam turbine steel casting job, especially in respect to cylinders, and costs rose proportionately because of increased weld, chip-out and reweld charges."

As a result, foundry engineers initiated complete redesign of the desired unit and the turbine manufacturer assented to the cast-weld conversion undertaking. In finished form, before welding, the cylinder casting weighs 22,800 pounds. The valve check part weighs 5620 pounds, and total weight of the assembly is comparable to the previous integral casting.

Cost of the cast-weld assembly is slightly higher than the former one-piece unit, but that difference, according to the expressed views of both the maker and buyer, is insignificant, considering the savings in time formerly lost in rework before and after machining.

No Need for Rework—A very recent development, the converted steel-cast assembly, is now in process in the customer's plant. There has been no need for rework, and standardization on the two-piece redesign is intended for future requirements. Customer satisfaction is similarly reflected in the statement of the foundry engineer: "We have substituted two decent jobs for one 'stinker', and are in a position to realize a normal profit on the job. In the past, backcharges in some cases approached 30 per cent of selling price, and definitely resulted in loss on some jobs."

The particular steel castings are part of a 60,000 kw, 3600 rpm steam turbine project. Due to high operating temperatures of 950° F, the castings were poured in a low carbon alloy steel: C—0.18 max; Mn —0.70 max; Si—0.20-0.60; Cr—1.00-1.50; Mo—0.40-0.60.

The steam turbine manufacturer has standardized on this analysis to eliminate graphitization which developed on some old installations running at high operating temperatures.

Foundry-Engineered Redesign—Another example of foundry-engineered redesign is a freight car center filler. Originally steel-cast integrally, the part subsequently was made as a weldment, and eventually reconverted to cast-weld construction resulting in substantial reduction of costs, weight saving, enhanced serviceability and assured dependability.

As a weldment, using steel plate, the built-up center filler consisted of 17 separate parts requiring 672 lineal inches of weld, and weighed approximately 306 pounds. Converted as a cast-weld structure, to meet the foundry engineers' cost and quality objectives, the unit was completely redesigned to be made up of three separate steel castings welded and processed in the steel foundry for delivery.

Weight Reduced 30 Per Cent—The finished three-piece cast-weld assembly, Fig. 4, ready for application by welding or riveting directly to car center sills, weighs only 205 pounds, representing an important weight reduction of about 30 per cent. Redesign also required only 34 lineal inches of weld in comparison to 672 for the plate weldment—a reduction of 638 lineal inches in the assembled part.

In addition, the completed redesign development resulted in other tangible manufacturing economies translatable in lower price: Reduction of foundry core weight from 308 to 3 pounds per casting; reduction of cubic content of sand necessary per mold; substantial reduction in manpower and overhead crane operations; and material increase in daily output of molds. Also, new welding operation was developed to enable all welding to be done, in the foundry, in a horizontal position, another tangible economy factor.

New Assembly—Foundry-engineered redesign of a

Fig. 6—Cast steel idler gear rocker arm for a steam locomotive booster

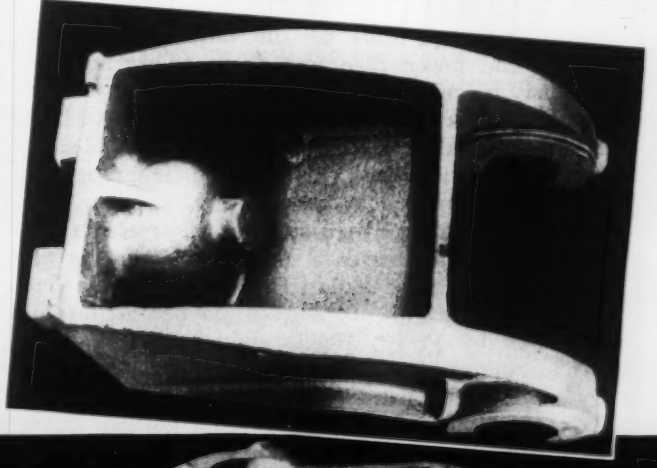


Fig. 5 — Completely converted cast steel trailer-hitch assembly, except for yoke carrier part

trailer-hitch unit began with consideration of how to achieve required improvements in a single part, and culminated in redesign of all four parts and development of a completely new assembly, by means of which a small manufacturer's sales were materially increased.

The steel foundry, Unitcast Corp. of Toledo, entered the picture after the inventor and manufacturer had completed basic design and had a welded pilot model of the so-called Tour-Aid assembly, a car-trailer attachment of advanced design.

Redesign of tow-bar pinion part for production as a steel casting resulted in smartly improved finished appearance necessary for consumer sales, and other plus-factors in the form of close dimensional tolerances, solidity and dependability.

Other Parts Analyzed—But the story didn't end there. Acting on the manufacturer's suggestion, the foundry engineers proceeded with engineering analysis of other parts forming the complete trailer-hitch assembly. Here again, redesign effected dollar-and-cents improvements, with subsequent conversion of three other parts to steel castings: Pinion yoke piece, rear yoke part, and yoke carrier.

Fig. 5 shows the completely converted trailer-hitch assembly except for the yoke carrier part which in actual use is fastened to the trailer tongue under the trailer's rear section to firmly seat the rounded supporting member of the rear yoke piece.

Other distinct balance sheet advantages gained through redesign conversion in this instance, as reported by Unitcast, included substantial cost reduction, reduced machine work, and elimination of misfits. Total weight of castings was 5 per cent less; total finished cost of steel castings was about 20 per cent less and machining costs on steel castings were around 75 per cent less.

As for strength factors, an actual Unitcast physical testing laboratory report rounds out the story: "Rear yoke casting (T-Loy alloy)—normalized. Casting was blocked on extreme ends with compression load applied on the Y-section. Casting showed no deformation up to 8000 pounds load, 1/32-inch deformation experienced where additional 1000 pounds load was applied after 8000 pounds, up to 12,000 pounds.

Idler Gear Rocker Redesigned — The idler gear rocker arm Fig. 6, for a steam locomotive booster, before redesign to a steel casting, weighed 147 pounds. Although the manufacturer was producing the part in his own plant, cost factors induced interest in discussing the advantages of a steel casting which would have to be bought outside.

Consultation between the engineering department of the manufacturer and the steel foundry engineer led to perfection of the conversion design, Fig. 6, and resulted in production savings of 12 per cent in cost and 5 per cent in weight plus other important benefits. A marked increase in dependability of the part was obtained through greater rigidity with toughness in the steel casting, and additional strength where needed—because of better distribution of metal in the steel casting process.

Every Pair a Perfect Match

MATCHING of mating cages for planetary gears is insured in Packard's Ultramatic drive by machining the parts with the same tools in a multiple indexing machine. The work, which is done at the Packard plant in the special Hoern & Dilts machine shown here, is precise and involves unusual operations, especially on gear pockets.

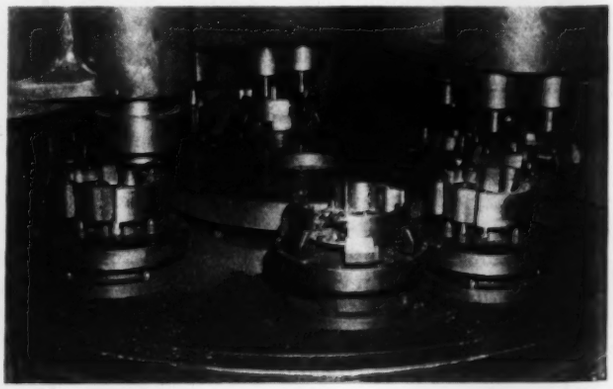
Mating Parts—Cages are made in two mating parts which are loaded in pairs in alternate fixtures on the circular indexing table of the machine. Location is from the lower face and from a bearing hole previously reamed in each half. A pair of parts is unloaded and a new pair put in place at the front station. Thereafter, each pair is indexed 90 degrees between operations and, in so doing, is brought in succession under each of three heads.

Each head has multiple spindles of precision type and each spindle carries a single-point carbide tool except for the first spindle which has four such tools. All spindles turn at 2400 revolutions per minute and are driven by V-belt. Heads are not fixed but are given a compound motion by a cam that brings the corresponding tools into correct position for making their respective cuts and gives them horizontal motion during the cuts.

In the first machining position, tools in the first head machine the top face of each half cage. Then this pair of parts is advanced to the second machining position where the tools spot face three areas in gear pockets at the bottom of each half cage.

Larger Pockets Spot Faced—When these cuts are completed, tools withdraw and the two parts are indexed to the third machining position. There, tools in three spindles spot face three larger pockets on the shorter piece and a tool on the fourth spindle faces a central spot on the other piece. This completes the cycle except for unloading.

Cuts have to be made with high precision of the same order as that done in precision boring machines, as limiting dimensions are exceedingly close. Despite this, about 35 pairs of parts are machined per hour.



Multiple-spindle Hoern & Dilts machine with three high precision heads used for facing operations on two halves of gear cages. Spot facing is done in pockets, each head having compound motion

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AUTOMATIC PIPE FINISHING

. . . gives close production control, eliminates excessive handling and economizes floor space

By WILLIAM K. STAMETS
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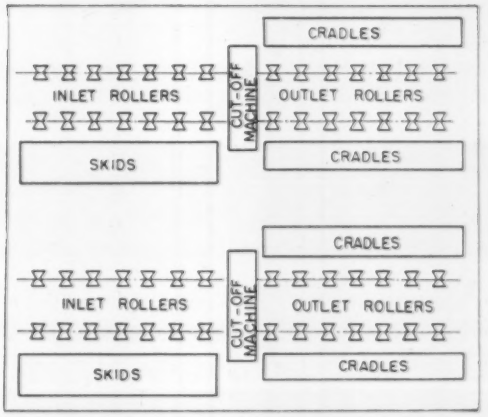

Fig. 1—Cutoff machines with inlet and outlet tables are arranged as shown here

INCREASED demand for pipe within the last few years has made it necessary for the pipe manufacturers to increase production and improve quality. In the Oct. 24, 1949, issue of STEEL, Bryant Bannister, consulting engineer for National Tube Co., described steps taken by National Tube to meet this increased demand. Their new mill has the capacity of 48 tons per hour or approximately 18,000 tons of 2-inch to 4½-inch OD pipe per month.

A finishing floor capable of handling this tonnage must have sufficient machines to insure continuous flow of the pipe to prevent an overflow in the storage areas. However, from a standpoint of cost and available floor space, the number of machines on the finishing floor must be as few as possible. The answer is automatic equipment which enables management to closely control production, eliminate excessive handling and economize floor space.

Machining equipment to fill these requirements includes two duplex cutoff machines with inlet and outlet tables for handling the pipe, arranged as shown in Fig. 1; six duplex chamfering machines, four duplex threading machines and handling tables with indexing equipment for conveying the pipe to and from the chamfering and threading machines. The chamfering and threading machines with their tables are arranged in three "lines" as shown in Fig. 2.

Cutoff Operations—Prior to chamfering and threading operations, pipe must be cropped and cut to proper lengths. This is done by two duplex cutoff machines, served by the inlet and outlet tables.

An interesting feature of the cutoff machines is their completely automatic operation. This allows the machines to set the pace with regard to production requirements. As pipe is received on the skids, where it has been previously placed by the kickoff from the straightener outlet conveyor, it rolls by gravity until stopped at the cutoff machine line as illustrated in Fig. 3. Selector pushbuttons are provided so that the pipe may be loaded on either the near side of the inlet stand, or the far side, or on both sides for simultaneous handling into the cutoff heads.

When the proper selector switch for operating with two lengths of pipe at a time is set, and the system is put into operation, the pipe is indexed onto the inlet rollers. The rollers move the pipe toward the cutoff spindles until it strikes an inlet stop which aligns both lengths of pipe so that the ends will be even as they enter the cutoff spindles. Striking the stop also stops the inlet tables, and lower the pinch roll and measuring device drive roll, which can be seen in the up-position in Fig. 3. When the pinch roll comes into position, the inlet stop lowers, and the inlet and outlet tables start and the pipe proceeds along the conveyors and through the machine.

The measuring device is set in operation and trips at a predetermined position of the pipe, to close the chucks and stop the inlet and outlet tables, locating the pipe for cutting the crop end. When the chucks are closed, the pinch roll and measuring device roll raise to the up-position. The cutting heads feed in and out parting the pipe and the cropped end falls clear of the machine.

Cutter Heads Start to Feed—After the pipe has been cropped, the chucks open, and the pipe proceeds along the conveyors until the pipe strikes a multiple length stop which has been set for the desired length of pipe. Striking the stop stalls the tables, closes the chucks, lifts the length stop, and starts the cutter

Fig. 2—Diagram showing arrangement of chamfering and threading tables

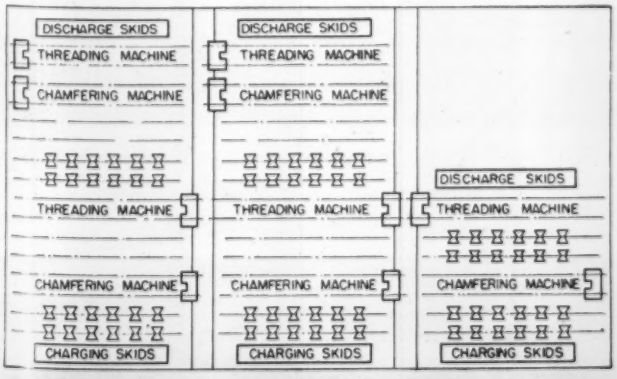

Fig. 3—Detail view of inlet side of cutoff machine with measuring device drive roll up

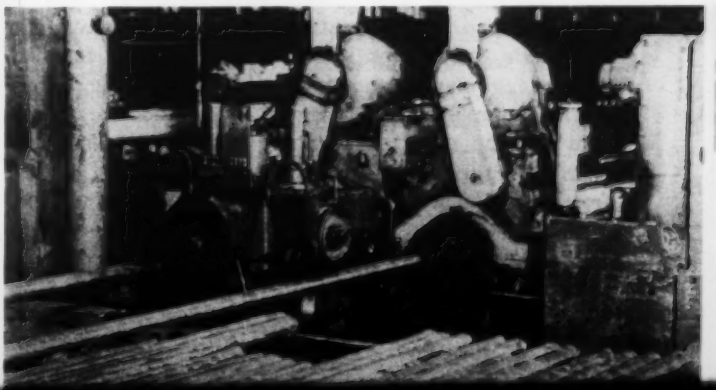

Fig. 4—View of entire finishing floor

heads to feed. The feed operates in and out as before; but now only the outlet chuck will open when the feed returns to the out position, while the inlet chuck remains closed. Outlet rollers will also start, moving the cut lengths of pipe along the outlet tables where they are kicked off into the cradles.

After the kickoff returns to the down position, the inlet chuck opens, the inlet tables start, the multiple length stop again drops, and the pipe will move through the machine to the stop and the second length is cut as before.

When the end of the pipe has cleared the inlet tables, the indexing device is again set into operation reloading the next two lengths of pipe onto the inlet rollers. An important feature is that each machine can work two lengths of pipe at a time as above or one pipe in the first trough only, or one pipe in the second trough only. If, while working only the second trough, another pipe should inadvertently fall into trough No. 1, the inlet motors would stop, and thus prevent running the pipe into the idle cutting head.

Chamfering and Threading Lines—Pipe is removed from the cutoff machine cradles by cranes and transferred to storage racks, or to the chamfering and threading machine lines. Three of these lines can handle pipe from 18 to 65 feet long. Two of the lines are provided with a duplex chamfering and a duplex threading machine on each end of the handling tables; and the other line is provided with only a chamfering machine on each end of the table. Fig. 4 shows these three lines. The line in the foreground has only the chamfering machines.

Pipe placed on the skids is indexed onto the inlet rolls in the same manner employed on the cutoff machine inlet tables. The rolls are automatically set in motion, conveying the pipe to stops which line it up properly for the machining operations. The shuffle bars then go into operation, lift the pipe from the inlet rolls, and place it in the chamfering machine chucks for clamping. After the chamfering operation is completed, the chucks open, and the shuffle bars lift the pipe to the next set of V-blocks which is an idle station. In the meantime, two more lengths have been indexed onto the inlet rolls, are positioned and moved to the chamfering machine chucks on the same movement of the shuffle bars.

On the next movement of the shuffle bars, six lengths are handled, placing the first pair in the threading machine chucks, the second pair on the idle station, and the third pair in the chamfering machine chucks. Chamfering and threading machines operate simultaneously, and return to their neutral position after they have completed the machining operation. The chucks again open, and the shuffle bars move the pipe over one more station, placing pipe No. 1 and pipe No. 2 on the transfer rolls where they are immediately conveyed to the other end of the tables, and positioned for the machining operations on the opposite ends.

Pipe Automatically Moved—As each operation is completed the pipe is automatically moved across the tables until it is placed on the discharge skids, completely chamfered and threaded on both ends. Pipe No. 1 and pipe No. 2 are discharged as pipe No. 15 and pipe No. 16 are lifted from the inlet rolls. Thus 16 lengths of pipe are being lifted on each cycle of the shuffle bars.

Fig. 5 is a closeup view of the chamfering and the threading machines, and shows details of the clamping chucks, die heads and chamfering tools. The motor mounting and V-belt drive arrangement are also clearly illustrated.

The machines are arranged so that either spindle can be operated independently, as are the cutoff machines. This enables the operator to change tools or make repairs and adjustments on one spindle at a time without stopping the entire line. The chamfering machines or the threading machines can also be operated independently in the event only one of the operations is desired. This versatility in locking out individual spindles or entire machines is accomplished automatically through selector switches. Of course, if the No. 1 spindle of the first chamfering machine is locked out, the No. 1 spindle of all subsequent machines in that line must be locked out.

In like manner, if one No. 2 spindle is not operating all No. 2 spindles will be stopped. Regardless of which set of spindles is in use, if a pipe is accidentally placed on the wrong inlet roll, the entire operation stops to prevent the shuffle bars from placing a pipe at an idle spindle. Each station being used must contain pipe or the line will stop. However, when a run of pipe is being completed and it is desirable to clear the tables a selector switch is provided which will allow the operation to continue even though additional pipe is not being supplied to the inlet rolls.

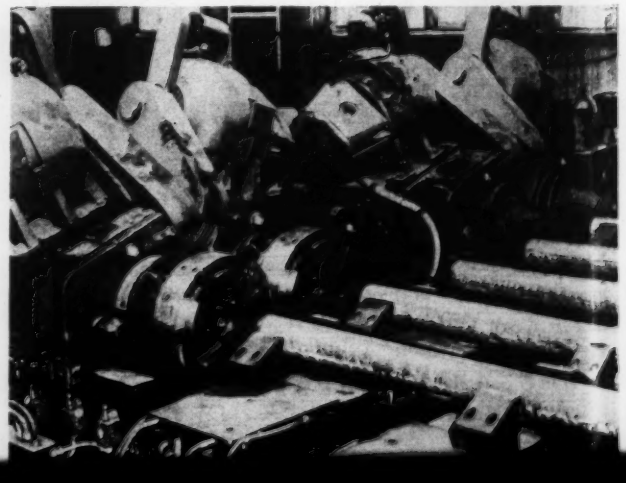

Fig. 5—Closeup of chamfering and threading heads

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SEEN AND HEARD IN THE Machinery Field

By GUY HUBBARD
Machine Tool Editor

GEOMETRY IN ACTION: This week I again find myself at The Homestead, Hot Springs, Va., where I am attending the annual meeting of American Gear Manufacturers Association. The fact that this is the 34th annual meeting reminds me that my own practical experience with gears began just about the time that AGMA was being founded. Thirty-five years ago this month I went to work in a machine tool plant, and I have been involved in that business one way or another ever since.

I have seen tremendous improvements in design, manufacture and marketing of gears and related products in those 35 years. It is my conviction that this progress has been much more rapid—and along a much more united front—than would have been the case had there been no AGMA. Free exchange of engineering and metallurgical information among members and promotion of engineering standards by the association certainly have tended to improve gear products and to keep costs within reason in spite of costlier raw materials, tightened limits on fit and finish and constantly rising wages, taxes, etc.

The gear industry, more than any other metalworking industry, can be described as "geometry in action". Although geometry of gearing has been quite well understood for more than 100 years, I can assure you that its applications—even to machine tool gearing—were all too often at a rudimentary stage even when I went into the industry. The same was true of automotive gearing. The kind of machinery that is demanded today would not operate successfully if it had to be equipped with 1915 vintage gearing. As a matter of fact some of the 1915 vintage machinery did not run any too well with 1915 gearing.

As I look over the membership roster of AGMA I see the names of many men—some of them active since the founding of the association—to whom we all owe a rising vote of thanks for better machine tools, better automobiles, better phonographs, better movie cameras and a hundred-and-one other things which are better because of what they have done to make better gears.

Some of these men are mathematical geniuses. Some of them have developed new systems of gearing. Some of them have invented new methods for cutting and finishing gearing. Some of them have improved gear metallurgy. Some of them have gotten traditional "bugs" out of gear mechanisms through ingenious work in research laboratories. AGMA has done a lot to inspire them in their work. AGMA has enabled them to compare notes and to pool their efforts. AGMA typifies the kind of technological-industrial-commercial co-operation possible only under our American system of free enterprise.

RATIONING SECONDS: On a number of occasions lately I have been invited "behind the front office" by companies which design, build and operate high speed automatic screw machines and related machines. Inasmuch as these are fields in which I specialized for many years, I have been able to make some interesting comparisons between old ways and new ways in this line of business.

My earliest and strongest impression is that automatic designers and tool engineers in 1950 are "rationing seconds" as carefully as we used to ration minutes. This is due in part to the fact that high man-and-machine hourly rates make cost of seconds something to be seriously reckoned with, and in part to the fact that carbide tooling makes it possible to run off jobs in seconds which used to take minutes.

In other words, where we used to be content with the leisurely tempo of a cuckoo clock, designers today are aiming at the tempo of a machine gun. The result is that where we used to build machines which embodied altogether too many "cuckoo clock standards", automatics of 1950 vintage must embody all the precision and "snap" and reliability of a machine gun.

High spindle speeds and fast feeds demand careful attention to bearing design and spindle balance as well as instantaneous stopping, starting and precise limitation of travel. Fast as the working speeds are—return speeds are much faster to cut nonproductive time to the bone. With all this goes concentration and multiplicity of tooling which would have staggered setup men of a generation ago. This demands that various things get out of the way of each other with small margin of safety. "Two things can't occupy the same space at the same time" in a 1950 automatic any more than they could in a 1915 model. Penalty for defying that rule is a dangerous and costly smash-up.

One of the most impressive things about what to me are sensational improvements in automatic design and tooling, is that now—as always—these machines still are in large measure actuated by cams. Practical machine tool men always have insisted that almost anything can be accomplished by cams. After seeing what 1950 automatic designers are doing with cams, I am 100 per cent in agreement on that point.

CROSS-BRED MACHINES: I often have been puzzled lately to determine where "the machine tool ends and something else begins" in mass production installations. It looks to me as though we may be entering an era of "cross-bred machines"—part machine tool, part material handling mechanism, part gaging apparatus, part assembly device. Some of the cross-bred machines involve even strains of heat treating equipment—as in the case of automatics which induction harden set screws.

Just where we go from here, I don't pretend to know, but certainly we are on our way and the general direction is toward uninterrupted production flow.

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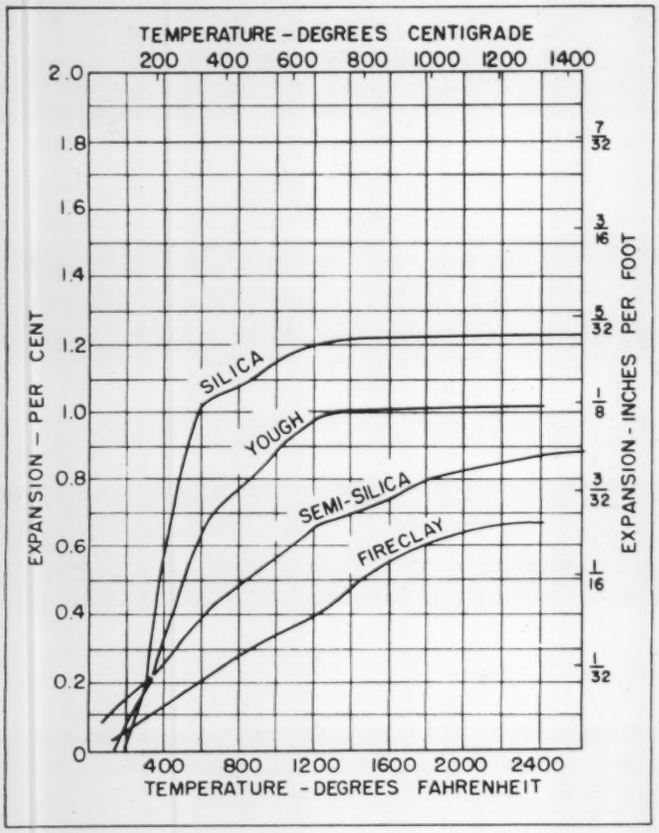
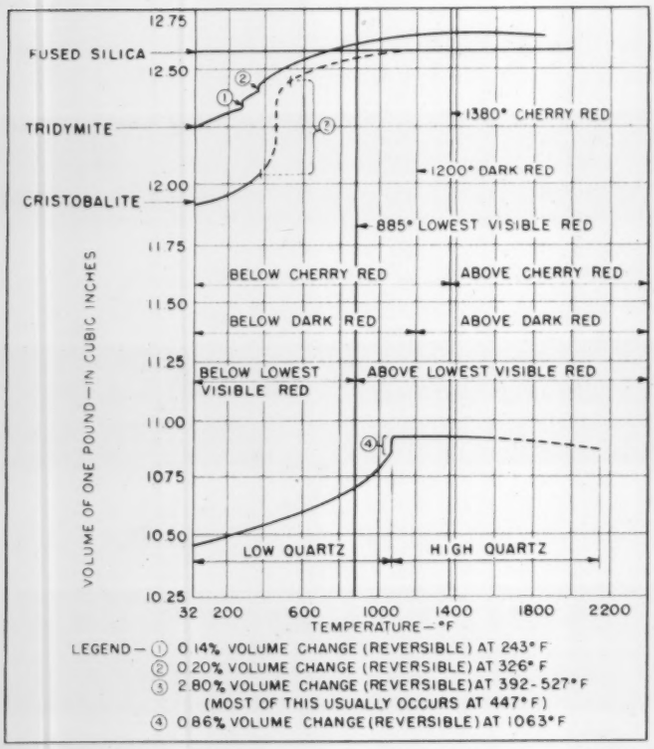


Fig. 6—Thermal expansion curves for different types of refractory brick are presented graphically

Fig. 7—Relation of volume to temperature for principal forms of silica



PROPER

By R. P. HEUER
Vice President
and
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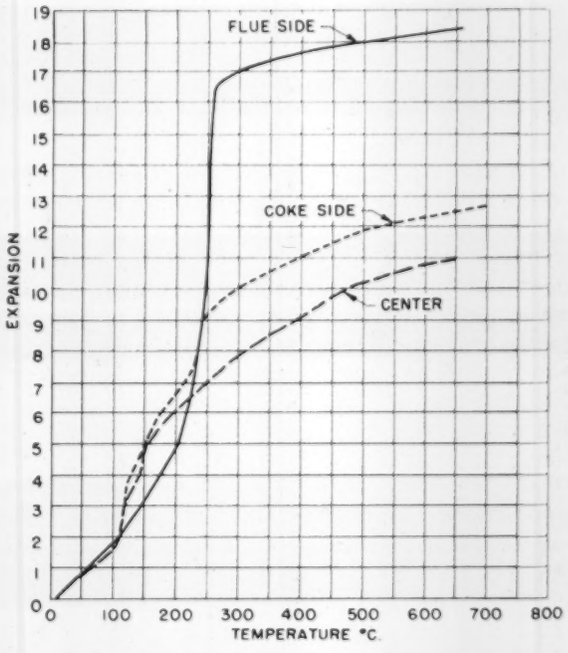
Service Research Engineer
General Refractories Co.
Philadelphia

PART II

SILICA and fireclay refractories, in the United States are used almost exclusively in by-product ovens, although there is a minor use of Sillimanite shapes. Semisilica brick are still used to some extent in Europe, although many ovens are built according to modern American practice. America's greatest contribution to the remarkable efficiency and extremely long service of modern by-product ovens has been the adaptation of silica brick to the high temperature location for which they are so admirably suited.

The earliest oven coking chambers were lined with fireclay brick, but while the ovens were much smaller than those of today, life of linings was only from 5 to 10 years. These ovens were very difficult to keep tight because they suffered a fairly large expansion and contraction as the brick changed volume with every change of coking time and even with every fresh charge of coal. This continual expansion of fireclay brick not only led to troublesome, inefficient operation, but was also largely responsible for short oven life. The relatively poor resistance of high-duty

Fig. 8—Linear thermal expansion of the several layers of brick from plant "X"



COKE OVEN REFRACTORIES

Reduce Overhead Costs

Successful coke oven job depends upon joint long range planning of an experienced oven builder and an experienced refractories producer—working as a team. In this article various refractories recommended for all types of coke ovens are discussed

fireclay brick to load and abrasion at high temperature also caused troubles.

The next step in the evolution of modern refractories practice in these ovens was the change from fireclay to semisilica brick. (See Fig. 6 for thermal expansion.) These are far superior to ordinary alumina-silica brick—except the Sillimanite (mullite) type—in resistance to load at temperatures up to 2650° F. The relation of the various brick in resistance to abrasion is probably about the same as that for load resistance. While semisilica brick were a great improvement over high-duty fireclay brick, they were still not entirely satisfactory. They were gradually replaced with silica brick, which are far better for the high temperature sections of these ovens.

Silica Brick Advantages—Silica brick have numerous advantages for use in coke ovens and only one disadvantage. Based on their resistance to load and abrasion at high temperature these unique refractories are superior to semisilica brick by an amount even greater than that by which semisilica brick excel high-duty fireclay brick. Silica brick are practically spall-proof above 1200° F, because their thermal expansion is nil (Fig. 6). They are also immune to carbon disintegration and have about a 25 per cent higher rate of heat transfer than fireclay brick at 2400° F. Top quality silica brick contain about 90 per cent cristobalite—the stable crystalline form of silica above 2678° F—and small amounts of tridymite and lime-silica glass.

Because of their high cristobalite content, silica brick resemble this form of crystalline silica in that they remain rigid until close to their melting temperature and have a rapid, reversible, thermal expansion between 390 and 530° F.

Although slightly less refractory than certain types of fireclay brick, silica brick at high temperatures comprise a rigid skeleton of cristobalite crystals with

Fig. 9—Underground mining of raw material used in the manufacture of Yough silica brick

but a relatively small amount of liquid. This structure gives them much greater resistance than any fireclay brick to vitrification, shrinkage, load and abrasion at highest coke oven temperatures. They do not vitrify or shrink—instead they expand very slightly. Even under a load of 25 psi, a 9-inch straight silica brick on end and entirely surrounded by heat remains rigid until well above 2900° F.

Disadvantage of Silica Brick—Silica brick spall badly when heated or cooled too fast below 1200° F. Chief reason for this is that cristobalite has a large, practically instantaneous, reversible thermal expansion (almost 1 per cent linear) every time it is heated or cooled between 390 and 530° F. This is the inversion range between high and low temperature forms of cristobalite. The inversion usually occurs about 450° F. Comparison of the thermal expansion curves of the principal forms of silica (Fig. 7) with the curve for silica brick (Fig. 6) shows that the cristobalite imparts most of its own expansion characteristics to the entire brick. To avoid danger of spalling, temperature of the brick must be raised very slowly through this dangerous temperature range (390-530°F.), and preferably never allowed to fall below it, once it has been passed.

The intriguing anomaly of silica brick is that they are the most sensitive of all refractories to thermal shock below 1200° F and the least sensitive to the same force above that temperature.

Recommended Locations for Silica Brick—In modern ovens, silica brick are standard construction in the following locations: Coking chamber walls and the ribs which enclose the combustion flues, oven roofs (except at the ends), lower bench walls, corbels of checker chambers and inside curtain walls. There are several locations where either fireclay or silica brick may be used. Silica checker brick may be used when temperatures are high enough to cause excessive vitrification and deformation of fireclay brick.

Jamb blocks should be silica when abrasion and load, without excessive thermal shock, are encountered. If regular silica brick spall and fireclay brick deform from load, a special spall-resistant Yough silica brick, manufactured by a leading producer of coke oven refractories, may give better service (Fig. 6 shows thermal expansion).

Silica brick are sometimes used in main flues to resist load.

Fireclay Brick—These have many disadvantages for use in coke ovens and only one advantage—just the reverse of silica brick. They are used for all locations where there is no load or abrasion above 2300° F, or where silica brick spall.

The chief advantage of fireclay brick for coke ovens is their high resistance to thermal shock below red heat. Their disadvantages comprise relatively poor resistance to vitrification, shrinkage, load and abrasion above 2300° F; expansion or contraction with every change of temperature, fairly low rate of heat transfer and susceptibility to carbon disintegration.

Recommended Locations for Fireclay Brick—Fireclay brick are standard construction in modern ovens for these locations: Oven roof ends, foundation mats, top mats, oven chamber floors (usually stiff mud brick), charging holes and outside curtain walls. In the locations where either silica or fireclay brick may be used, checker brick and main flues are usually fireclay brick (some main flues are castable fireclay) while jambs are sometimes built of fireclay brick and cast iron to avoid spalling.

Oven doors are sometimes lined with castable fireclay when service conditions are not severe, but in most doors high duty fireclay brick are used. When carbon disintegration is likely to occur, without excessive thermal shock, Cone 18 blast furnace brick may give improved service. When thermal shock or carbon disintegration, or both, are extremely destructive, hi-fired super duty fireclay brick should be used.

Manufacture of Refractories—By-product oven refractories are made by a highly specialized branch of the refractories industry for which few producers can qualify. Even a one-battery job may require the simultaneous production of great quantities of large, relatively complicated shapes in two or more fireclay and an equal number of silica brick plants. The producer must have an organization in which every department employs a full quota of specialists trained in handling correctly, and with dispatch, the myriad details involved in all coke oven jobs.

Some of the larger ovens use 5000 or more special silica shapes (comprising some 500 to 700 different designs), as well as many different fireclay shapes. Some of these exhaust the ingenuity and technical "know-how" of even the most expert mold designers, mold makers and molders. Some can be made by the power press method; some are so large or complicated that they must be made by hand in heavy steel molds; others can be made either way.

Each step in the manufacturing process must be precisely controlled by coke oven brick experts, using special methods which give the "built-in" quality required to permit the brick to render a lifetime of service. This extreme care begins with selection of the raw material and continues while it is crushed and ground to proper size and put through two of the most important operations — mixing and tempering. The various mix constituents must be thoroughly distributed and the mix tempered to the "just right" consistency needed to permit molding brick of top quality.

The most difficult and crucial step in any coke oven job is the molding of the large or complicated hand-made silica shapes. Some molders who have made ordinary silica or fireclay shapes for many years cannot acquire the "knack" of making silica coke oven shapes. Some of these which can be made with ease by some experienced molders cannot be made at all by others. With other shapes, the success and failure of

WON'T MOVE: Aptly called the Mule, a material stop gage for use in cutting, shearing, punching, bending and sawing operations, will not move when side thrust is exerted by the cutting action of the tool. With its shock-absorbing feature, the gage, made by Mahl Equipment Co., Minneapolis, recoils with each cutting or shearing thrust, then returns to its original position. A compression spring may be set for heavy or light material; it is sufficiently heavy so that it cannot be compressed by shoving material against it. It is this spring that "gives" during the shearing then returns to its original setting

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these same molders may be just reversed.

Size and complexity of many of the special shapes require special care in drying, burning, and cooling to minimize stresses and cracking. All silica and many fireclay shapes are hammer tested for ring, then carefully inspected, loaded, and braced with extra care to avoid damage in transit. A leading producer of coke oven refractories uses schematic posters to constantly remind plant personnel of the necessity for care in all steps in the manufacture and handling of coke oven refractories.

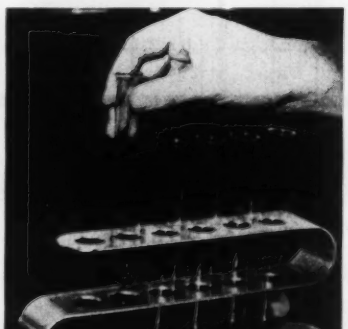
Coke Oven Job Requires Teamwork—A successful coke oven job depends upon the joint long-range planning of an experienced oven builder and an experienced refractories manufacturer, working as a team. It depends on meticulous adherence to a prearranged schedule if the building proceeds as planned. The coke oven "team" must synchronize shipments with the need for brick on the job. Once the brick laying starts, simultaneous shipments from several fireclay and several silica brick plants—often for different sections of several batteries—may be required frequently for many weeks or months.

Both builders and operators of ovens are primarily interested in lowest total cost per unit of product. One important factor in this cost is refractories. Both oven builder and operator are therefore interested in dealing with the brick manufacturer who has proved, through the years, that his product will give the lowest cost-performance ratio. It is on this basis that the position of leading supplier of refractories for by-product ovens has been attained. It is on this basis that it must be maintained. Each builder sets up his own specifications to help attain this objective.

Each oven builder specifies the location of each type and grade of brick and mortar. Three grades of fireclay brick are used on most jobs. Fireclay brick are chiefly high-duty, with low-duty second in amount, and intermediate-duty used in least quantity, if at all. All special fireclay shapes are normally high-duty grade. Low and intermediate-duty fireclay brick are usually standard shapes. Each type of brick is laid with a special mortar. Every builder has specifications for all types of brick and mortar. These are intended to insure that the materials are satisfactory, both chemically and physically, and that the brick conform closely to the specified size and shape and have reasonably strong, sharp edges and corners.

Heating Schedule for New Ovens—Oven builders supervise heating of new ovens, using schedules which have a large factor of safety as far as spalling is concerned. Even without spalling, the brick could be cracked or bond of joints broken. The heating schedules are so slow that when the cristobalite inversion occurs, it takes place simultaneously on the greatest possible depth of wall. This is essential to minimize stresses and strains which might cause cracks in joints or brick. Cracks, which would have no serious effect in other furnaces built of silica brick, cannot be tolerated in a by-product coke oven.

According to one major oven builder, 8 to 9 weeks should be used to heat by-product ovens to average operating temperature of 2000° F inside the coking chamber. For the first 7 weeks, gas is burned in temporary burners inserted through the doors into the oven chambers. A temporary hearth of fireclay brick is used to protect the silica walls. After 7 weeks, the gas is admitted into the flues and burned as in normal operation. Temperatures of the combustion gases are measured by a thermocouple until the brick reach about 1500° F. The optical pyrometer is then used to measure brick temperatures.



SOMETHING NEW HAS BEEN ADDED: Laboratories are going modernistic is small ways as well as large as evidenced by this aluminum test tube rack developed by Fisher Scientific Co. of Pittsburgh. It consists of a single piece of heavy anodized aluminum sheeting which will accommodate six test tubes of 4 inches in height or more. Corrosion resistant, the rack can be used in hot air ovens and other equipment where it may be subjected to many unusual conditions of temperature, moisture or corrosion

Measurements, taken once a week, show that the expansion of the oven brickwork is always close to the thermal expansion curve of silica brick. According to this schedule, temperature is raised to about 150° F in 4 days; 390° F in 24½ days; 530° F in 28½ days; 580° F in 30 days; 660° F in 32 days; 1090° F in 40 days; 1700° F in 49 days; and 2000° F in 56 days. Failure to follow the schedule, especially between 390 and 530° F, could result in serious spalling, choking the flues and obstructing the ovens. All oven manufacturers provide generally similar heating schedules.

Cooling Schedule for Used Ovens—Most modern ovens are kept above 1200° F with gas, even during prolonged strikes. Few are ever shut down cold except during major depressions. The reason is the extreme danger of damaging the structure during the cooling and subsequent heating in the range of 390 to 530° F.

The large, rapid, expansion of "as received" silica brick when heated from 390 to 530° F is matched by a similar, rapid, contraction—usually 20 to 45° F lower—when the brick cool. After years of service, the brick are so altered as to make them even more sensitive to temperature changes.

Austin and Pierce in their paper "Constitution and Thermal Expansion of Silica Coke Oven Brick After Service" concluded that "in cooling a battery of ovens, great care should be taken to cool slowly through the temperature range 200 to 300° C (392-572°F)". This conclusion was based on the examination of two brick after service—one after 11 years near the floor in a vertical flue at temperatures of 2130 to 2300° F; the other after about 20 years, a little higher up in the flue, in a battery operated at 2570 to 2710° F. A layer about one-tenth of the wall thickness, on the flue side of both brick, consisted of a relatively hard, dense, white material which was almost completely cristobalite. This was adjacent to a layer—comprising about eight-tenths of the wall thickness—which was mainly tridymite. The other one-tenth of the brick on the coke side had changed but little. Curves in Fig. 8 show that the thermal expansion of the flue side is like that of silica brick below 480° F and like cristobalite between 390 and 530° F. In this range, the brick expanded 1.2 per cent—four times the expansion of the coke side (or of unused silica brick) in that temperature range. The different crystalline composition, physical structure, and thermal expansions in the various sections nat-

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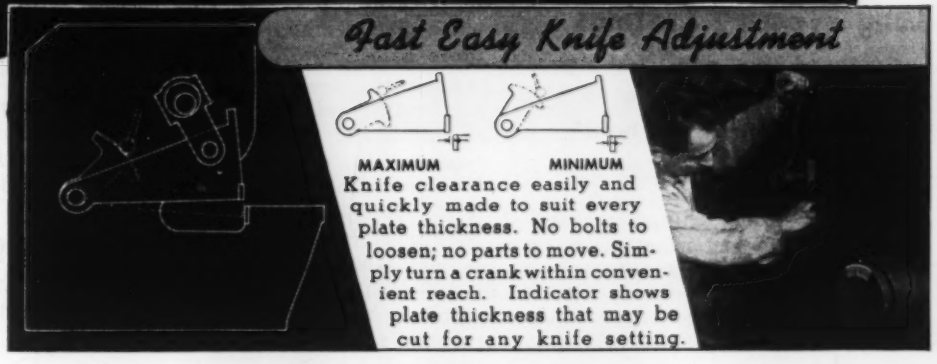
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STEELWELD PIVOTED BLADE SHEARS

urally increase the stresses set up between sections. Therefore, used silica brick in ovens are much more likely to spall between 390 and 530° F than "as received" brick.

Heating Schedule for Used Ovens—When an oven, cooled after years of service, is heated up with the used brick still in place, it should be done with due consideration of the fact that the brick are far more sensitive to thermal shock between 390 and 530° F than "as received" brick. The only extenuating circumstance is the fact that there is no longer any moisture in the brick and mortar. The new brick put in on hot repairs are usually heated from 8 to 11 days from the time the door is put on until the oven is ready for charging (temperature at 2000 to 2100° F).

Beehive Ovens—These units are a much older type than by-product ovens. They are also much smaller and simpler, as well as slower and less efficient. They comprise a hemispherical refractory brick structure having a bottom, side walls and a domed roof or crown. They are built in rows which sometimes exceed 100 ovens. Although conditions are not severe, a large battery uses great quantities of brick.

Refractories — Fireclay brick are used in bottoms and side walls. Crowns are usually built of a special spall-resistant, Yough, silica brick—a unique product for this purpose manufactured by a leading producer of by-product coke oven refractories. These brick have been used for the crowns of most beehive ovens reactivated in the past 10 years. They have been shipped all the way from Pennsylvania to Utah for use in beehive ovens—in preference to regular silica brick available close at hand. Although their composition, refractoriness, resistance to both load and abrasion, differ but little from regular silica brick, they resist spalling much better. This combination of properties is due partly to use of special high silica rock, (Fig. 9), and partly to a special burning schedule.

The increased resistance of Yough to spalling is due to its unique thermal expansion curve (Fig. 8). This is much lower than that of silica brick and has far less expansion at the dangerous cristobalite inversion point.

A Belgian coke oven is a rectangular oven using the beehive principle. Yough brick give best service in upper walls and crowns. Fireclay brick are used in all other sections.

Flat Ovens—These are arched rectangular chambers having low side walls and a flat tile floor. Heat is applied through flues below the floor. The flues—in which the temperature range is 2400 to 2700° F — are connected to regenerators built into brick are used in all sections except the foundation. High duty fireclay near the floor. The load and abrasion in the hearth area, together with thermal shock above 1200° F usually require that hearth tile, piers, and side walls to the top of the charge be built of silica brick. Silicon carbide brick sometimes replace silica brick for severe service.

Long Wearing Castings

Produced by new technique; gray-cast and requiring no annealing, castings are hard

CYLINDER sleeve castings which will considerably outwear those cast by conventional centrifugal methods after machining and installing in an engine are made by a process developed by Perfect Circle Corp., Hagerstown, Ind. By using new foundry techniques in producing this centrifugal casting, the cylinder sleeve castings can be made to combine the best features of statically cast sleeves and those cast by using the conventional centrifugal method in which water-cooled molds are used.

Castings are gray as cast and require no annealing. Out-of-roundness is said to be held to a maximum of 0.010-in. They are said to be free of dirt, not porous and not subject to shrinkage, besides having no scale or decarburized layer to be removed. Process is the result of almost 10 years of research and developmental work by the Indiana company.

Techniques involve use of a spinning machine designed by the company's engineers and metallurgists on which the handling of all molds is completely automatic. Spinning time, mold temperature, die coating consistency and thickness are also controlled automatically. Outer and inner diameters of the castings may be held to plus or minus 1/32-inch, while length may be held to plus or minus 1/64-inch. Stock allowed for clean-up is ⅛-inch on the outer diameter and 3/16-inch on the inner diameter.

Microstructure obtained on the inner wall is said to duplicate that of the static cast structure which has given the most satisfactory wear. A minimum of 70 per cent AFA type A graphite is regularly maintained, with most castings running between 80 and 100 per cent. A virtually complete pearlitic matrix is maintained and massive free ferrite and carbide reportedly are absent from the wearing surface.

In addition to iron, the chemical components of the sleeve castings are as follows: Total carbon, 3.20 to 3.45 per cent; silicon, 2.00 to 2.40 per cent; sulphur, 0.12 maximum; phosphorus, 0.25 maximum; manganese, 0.50 to 0.80 per cent; chromium, 0.25 to 0.65 per cent; copper, 0.40 to 1.00 per cent; nickel, 0.40 to 1.00 per cent; molybdenum, 0.10 to 0.50 per cent. Hardness of castings currently in production ranges from 229 to 269 Brinell. Minimum tensile strength is 40,000 psi.

Technical Author's Manual

TECHNICAL and scientific writers will be aided by an *Author's Guide*, a start-to-finish manual on the most efficient methods of handling manuscript, illustrations, and proof for technical articles. Published by John Wiley & Sons Inc., New York, for $2.00, it shows the technical author how his manuscript progresses through principal stages on its way to publication, acquainting him with the functions of the skilled and experienced workers required to bring his work to the printed page. Information is included on formal publication and copyright, preparing for reprinting, revisions and new editions and on details of editorial style.

Might Affect Your Golf

ALTHOUGH it might be difficult to translate the savings into strokes on the golf course, Hillerich & Bradsby Co., Louisville, Ky., has been able to realize considerable savings and increase output of golf club heads with the introduction of power brushing. The golf club heads, made of stainless and carbon steels, are finished with a 16-inch diameter Monarch section brush, made by Osborn Mfg. Co., Cleveland. It is reported that considerable savings have been realized because of longer brush life.

In the case of carbon steel heads, brushing is the last finishing operation prior to plating. The brush applies the final finish on stainless steel heads. It is said that these fiber brushes are able to modify and change the condition of metallic surfaces.

Action of the brush is that of blending imperfections and surface irregularities rather than the actual removal of metal. Brushes are used on a buffing lathe at the speed of 1750 rpm. It is the final operation following grinding and set-up wheel polishing.

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2 Slip one half of flange, with cup side facing assembler, over shaft.
3 Slide bearing and collar on shaft.
4 Slip other flange over shaft with cup side toward bearing.
5 Line up bolt holes of flanges with bolt holes on machine, slide bearing into proper position and bolt unit in place. DO NOT TIGHTEN BOLTS.
6 Repeat for other end of shaft and then tighten bolts on both ends.
7 Engage locking collar by turning in direction of shaft rotation until cam in collar drops over cam on inner ring. Continue turning until cams lock. Tighten set screw.

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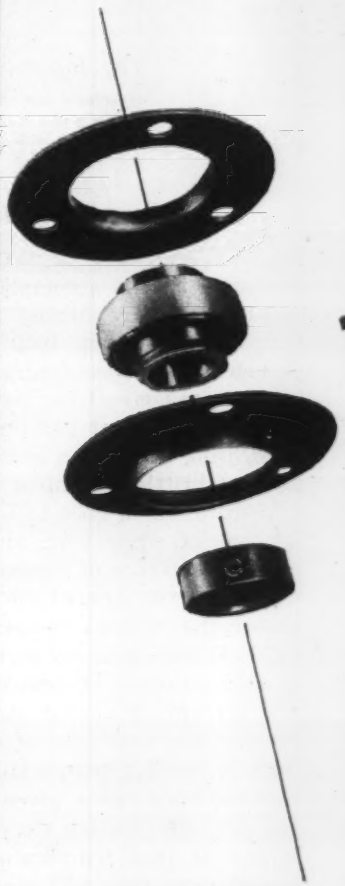

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Production of

MALLEABLE CASTINGS

It has often been stated that malleable iron is the most easily machinable and free cutting of ferrous metals of comparable or higher strength. The fact that this is so, in a metal which is both tough and possesses such versatile castability, accounts for the large use of malleables in the high-speed production automotive industry

By JAMES H. LANSING
Technical and Research Director
Malleable Founder's Society
Cleveland

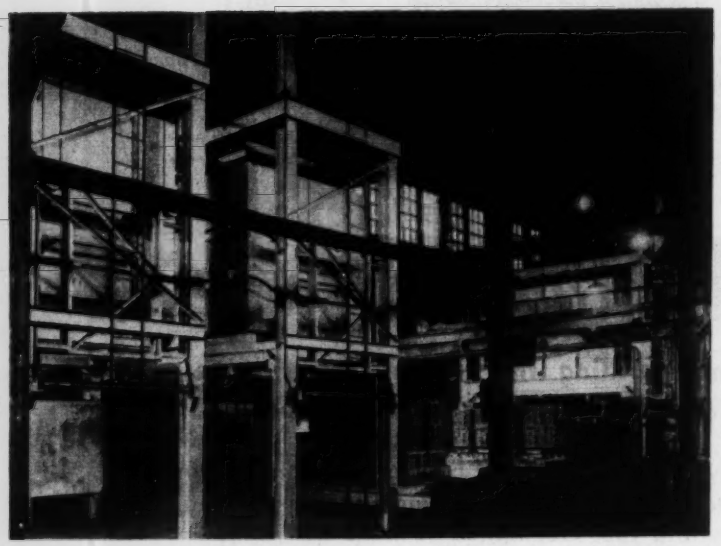

Fig. 8—Castings require no protective pots in this electrically heated elevator-type furnace

Fig. 9—View of pots used in periodic pot-type or in tunnel car ovens. Stacks of pots on car at door of oven are seen at right

PART II

IN THE annealing department, heat conversion into malleable iron is accomplished in a furnace in which the castings are heated for some time, first at a temperature of some 1600° F, to break up the massive carbides, and subsequently, at a temperature of about 1300° F, to convert the last of the combined carbon to ferrite and temper carbon. In the original white, or hard, iron, all carbon is in the combined form, either in hard brittle cementite (carbide of iron) or in the cementite which goes to form pearlite, the other constituent of white iron, and which consists of a mechanical mixture of cementite and ferrite (carbonless iron). In the anneal, as white iron is heated just above the critical temperature, between 1330 and 1370° F, the pearlite is transformed into austenite, a solid solution of cementite in iron. In austenite, the amount of carbon depends on the temperature, because the solubility of cementite in austenite rises with increasing temperature. Advantage is taken of the fact that, at a given temperature, say 1600° F, the austenite having dissolved all the cementite that it can at that temperature, when held there for a considerable time will precipitate some of the carbon which was in the cementite out of the solid solution in the form of temper carbon. Then the austenite, no longer saturated with cementite, dissolves more cementite.

As the iron is held longer at the 1600° temperature, more carbon is precipitated by the austenite and more cementite dissolved until all the free cementite has been dissolved and most of the carbon precipitated. It is then necessary to break down the remaining austenite into temper carbon and ferrite. When the temperature is lowered from the approximately 1600° high holding temperature the solubility of cementite in austenite decreases, more carbon being precipitated. At, or slightly below, the 1330-1370° F critical range the austenite becomes unstable and

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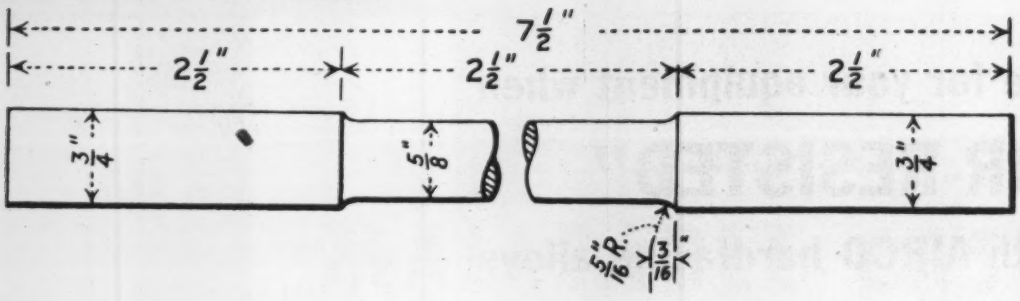

Fig. 10 — Standard malleable tension test specimen

tends to revert to pearlite. This is retarded by the high silicon content and a slow rate of cooling or holding at, or just below, this temperature. Maintaining the temperature just below the critical range, spheroidizes the cementite of the pearlite and in time it decomposes into ferrite and temper carbon. Thus the iron has become malleable.

The exact annealing cycle used depends considerably upon the type of annealing equipment available. Annealing furnaces are of either the periodic (batch) or continuous-type. Periodic furnaces include the conventional pot-type, muffle furnace, car-type, and elevator-type furnaces. They are heated by pulverized coal, oil, gas, radiant tubes, or electricity. The tunnel car-type gas fired furnace and the roller tray-type heated by electricity or gas are continuous furnaces.

During the anneal, the castings must be protected against the scaling and excessive decarburization produced by an oxidizing atmosphere, or the furnace atmosphere must be rendered nonoxidizing by sealing against any excessive entry of air, or by the admission of regulated amounts of treated gas. The mass to be heated is increased and heat transfer slowed by packing to prevent oxidation and warpage. Thus the annealing time requirement is greater, principally during heating to temperature and cooling to the critical temperature for holding in the second stage of the anneal, when the castings must be protected from the oven atmosphere by heavy containers.

Widely used for years have been the conventional periodic-type annealing furnaces, built of brick, well insulated, and direct fired by coal, oil, or gas. These ovens generally hold some 20 tons of castings packed in stacks of protecting iron pots or boxes. Each pot is approximately 2 feet long, 2 feet wide x 1½ feet deep. It may be an open ring, in which case, slag, silica gravel, or pebbles are used to suport and protect the castings, or each pot may have an integrally cast bottom. In the latter case, packing material is unnecessary, as each pot seals the top of the pot beneath it, the top pot being covered by a plate. Three or four pots are customarily stacked vertically upon a stack bottom or stool casting, supported by feet which permit engagement by the fork of a power lift truck for placing stacks of pots in the furnace, and allow circulation of the oven atmosphere beneath the stacks.

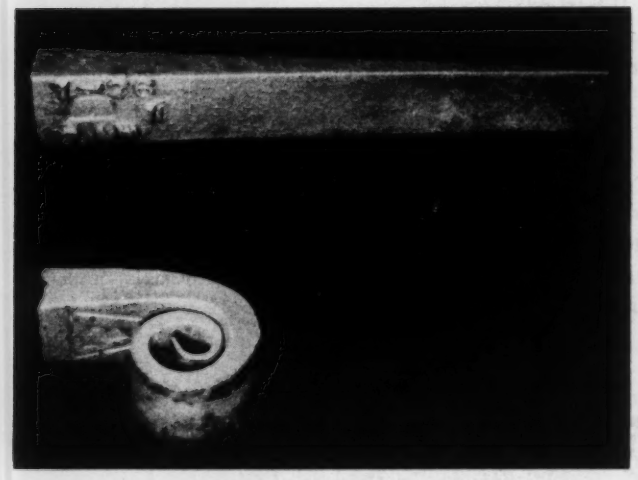

Fig. 11—Malleable iron wedges, before (top) and after the test

Ovens of this periodic pot-type, are normally fired by pulverized coal or oil, at one end, the heat passing over the tops of the pots to the front door, then being pulled back beneath and between the stacks by flues placed in the bottom of the rear wall. Temperature is controlled in accordance with pyrometer readings. The time required to bring the castings up to the annealing temperature of some 1600° F will vary somewhat depending on the size furnace and type of fuel, taking 24 or 36 hours or possibly more. A typical cycle would then be: Hold about 40 hours at 1600° F, cool to 1400° F in 15 hours, to 1275° F in another 15 hours, hold at 1275° F for 20 hours then cool to a temperature at which the stands can be handled in another 15 hours, a total of about 130 or more hours.

In electric batch-type (See Fig. 8) or radiant tube batch-type furnaces, pots are not required, as the oven atmosphere is not sufficiently oxidizing to scale the castings in the case of the electric-type, and generally has gas introduced to prevent scaling, in the case of the radiant tube ovens. The mass to be heated is therefore much less and the heat transfer effected more rapidly. Accordingly, the cycle may be completed in half the time required by the pot-type furnaces, or less, especially if the high holding temperature in the anneal is increased to 1700 or 1750°. At these temperatures the reactions are much more rapid. Electrically heated elevator-type furnaces (See Fig. 8) also generally have both high and low temperature chambers, the car being elevated into the high temperature chamber for the first stage of the anneal, then transferred to the low temperature chamber for the second stage. This effects a further economy of time and heat.

Continuous annealing furnaces may be tunnel car-type gas fired or roller tray-type, electrically or gas

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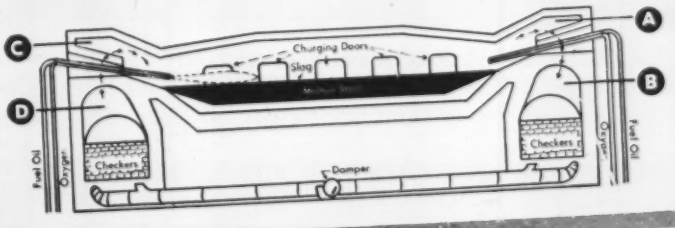

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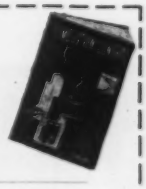

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Fig. 12—Malleable differential cast as cast and as finished on a Bullard Multamatic at a rate of 127 pieces per hour

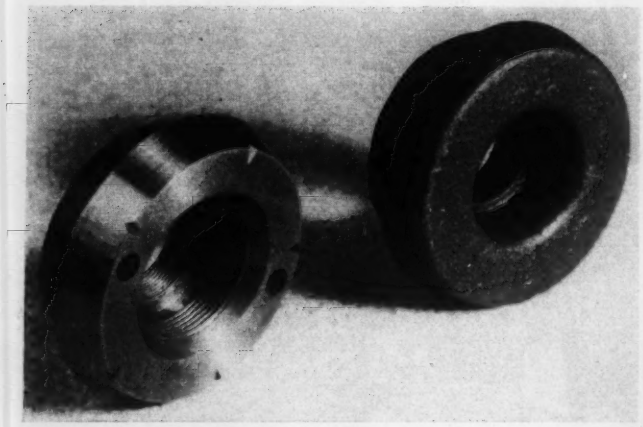

Fig. 13 — Five-inch malleable anti-aircraft shell adapter casting, as machined and as cast

heated. As the required temperatures are regularly maintained in the various zones and relatively small masses enter a zone at one time, heat transfer is further accelerated so that the tunnel car time requirement may not greatly exceed that of the electric or radiant tube batch-types (See Fig. 9). For the same reason the roller tray-type oven time requirement may be reduced to 30 or 40 hours less. From the standpoint of the user, annealing time is only important in connection with the first castings coming through on an order. Subsequently, castings become regularly available in accordance with the rate of foundry production, irrespective of whether the annealing process involves 3 or 6 days. Annealing time may be reduced by employing a relatively high silicon content of about 1.50 per cent, however, it is then especially important that the carbon content be on the low side and that other precautions be taken to prevent the formation of primary graphite in the original hard iron. Phosphorus content should also be reduced to a 0.10 per cent maximum.

Samples are regularly tested to check the completeness of the anneal as any retained combined carbon would decrease malleable's normal ease of machining, also reduce its toughness and ductility. Standard tensile test specimens produced in accordance with the American Society for Testing Materials specifications are regularly tested. ASTM specification A-47 for malleable iron castings, provides for the values shown in Table I. A standard tension test specimen is of the form and dimensions shown in Fig. 10.

Following the anneal, casting gates are ground or sheared, unless a gate grinding operation has already been performed. They are then cleaned, usually by centrifugally blasted shot, grit, or sand, in rotary barrels. Such castings as may have warped slightly in the anneal, are straightened, usually by heavy hydraulic presses, and following inspection, are ready for shipment.

Indicative of malleable's customary applications are the size and weight ranges in which the castings are most widely used. Malleable iron is produced in sections from 1/16-inch to 2 or more inches in thickness. The 2 or 3-inch section can be malleablized as completely as the 1/16-inch section. Generally a metal thickness of 3/16 or ¼-inch with strengthening ribs is well adapted for small castings. For castings of medium size, sections of ½ to ¾-inch in thickness are typical.

Within reason, light and heavy sections may be incorporated in the same castings. For example, an automotive differential carrier, weighing some 20 pounds, may have bearing seat sections which incorporate a 1¼-inch cube of metal, but some of its wall sections and ribs may not be over ¼-inch in thickness. Approximately 75 per cent of all malleable castings produced do not exceed 18 inches in length and 25 pounds in weight. Large quantities are produced weighing less than 1 pound, this also applying to 5 and 10-pound classifications. Illustrative of what is considered a heavy malleable iron casting, is a 300-pound automotive truck rear axle housing. Such a casting, generally has sections varying from ½-inch to 2½ inches in thickness, depending upon the functions of its various parts.

The material's shock resistance is probably best demonstrated by the use of a wedge 1-inch wide (see Fig. 11) which tapers from a thickness of ½-inch to a thickness of 1/16-inch in a distance of 6

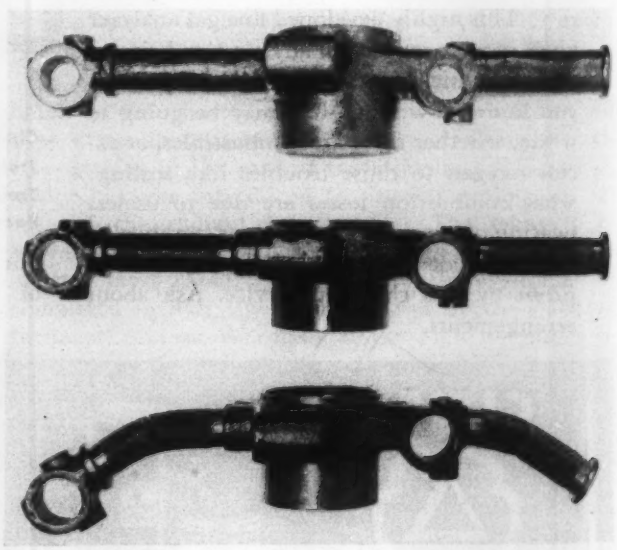

Fig. 14—Oerlikon gun, control casting of malleable iron. At top is shown original casting, middle is finished gun part, and bottom is the casting tested to destruction. Note toughness of the material

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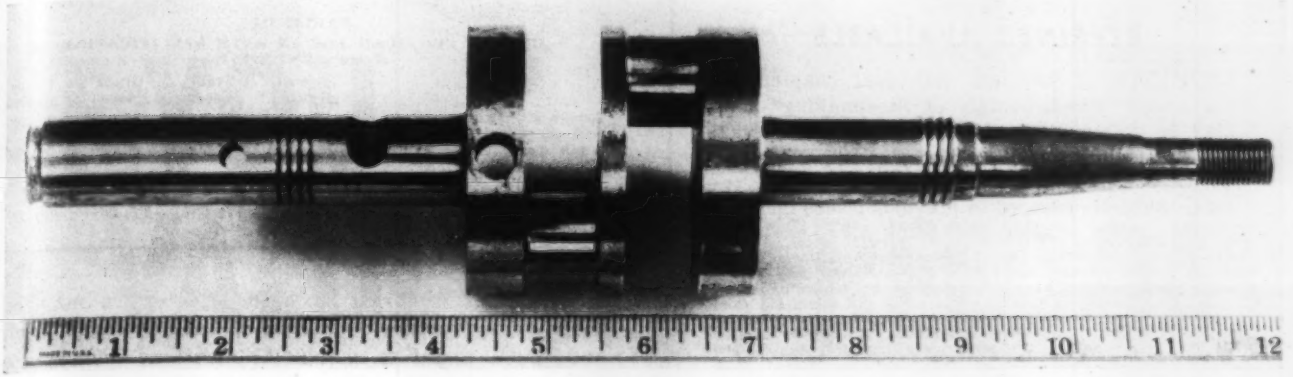

Fig. 15—Pearlitic malleable crankshaft for small utility motor

inches. It is placed on the anvil of the wedge test machine and a weight of 21 pounds is allowed to fall on the tip of the wedge. Blows of 70 foot pounds are thus struck on the specimen. It is an extremely severe test, in that the first blow falls on one-sixteenth of a square inch, and each succeeding blow on a somewhat larger section, depending upon the extent of the curl of the wedge, resulting from the impact of the tup. Wedges tested in this manner regularly run in excess of 20 blows and provide an excellent illustration of toughness and impact resistance.

It has often been stated that malleable iron is the most easily machinable and free cutting of ferrous metals of comparable or higher strength. The fact that this is so, in a metal which is both tough and which possesses such versatile castability, accounts for the large use of malleables in the high-speed production automotive industry. (See Fig. 12)

Its high machinability is due to its uniformity of structure throughout and its nodular temper carbon which serves as a substantial lubricant on the cutting point of the tool. Formation of the chips which generally break up without creating undue pressure on the top face of the tool, avoids the generation of high heat, with a resultant lengthening of tool life.

Illustrative of malleable iron's machining properties is a table of relative machinability values developed by a producer of machine tools and published in *American Malleable Iron—A Handbook*. This table assigns relatively machinability values to a group of the more readily machined steels and to malleable iron, with SAE No. 1112 steel being rated as the base value of 100. The high machinability value of malleable iron is noted in the comparison that is shown in Table II.

Indicative of malleable casting advantages are some of the changes made to save raw materials and man-hours during the last war. They are as important in civil as in war time economy. In mentioning three or four of the many in which malleable use saved machine tool time and man-hours, we would include: A shell adapter in which a 2¼-pound malleable casting replaced 3¾ pounds of bar stock saving metal, machine tools and man-hours. (See Fig. 13) An Oerlikon gun control in the production of which 73 per cent of the metal was machined away as originally produced. In malleable iron it was necessary to remove only 32 per cent of the metal. (See Fig. 14) Again, pearlitic malleable tank track rollers replaced fabricated rollers at less expense of tools and time, and, most important of all, gave 10 times the life. Eye bolt lifting plugs, originally forged, were cast in malleable with the base cored out, so that a quarter pound of metal was saved on each shell, of prime importance also in making shipments abroad.

TABLE I
PHYSICAL PROPERTIES LISTED IN ASTM SPECIFICATION A-47

	Grade #32510	Grade #35018
Tensile strength, min psi	50,000	53,000
Yield point, min psi	32,500	35,000
Elongation in 2 inches, min %	10	18

TABLE II
COMPARISON OF MACHINABILITY VALUES

		Machinability Value	Brinell Hardness Number
Standard Malleable Iron		120	110—145
Pearlitic Malleable Iron		90	180—200
Pearlitic Malleable Iron		80	200—240
Steels			
SAE Number	**AISI Number**		
1112	B1112	100	179—229
1113	B1113	135	179—229
1120	.....	80	143—179
1118	C1118	80	143—179
1138	C1137	70	187—229
1022	C1022	70	159—192
4130	A4130	65	187—229

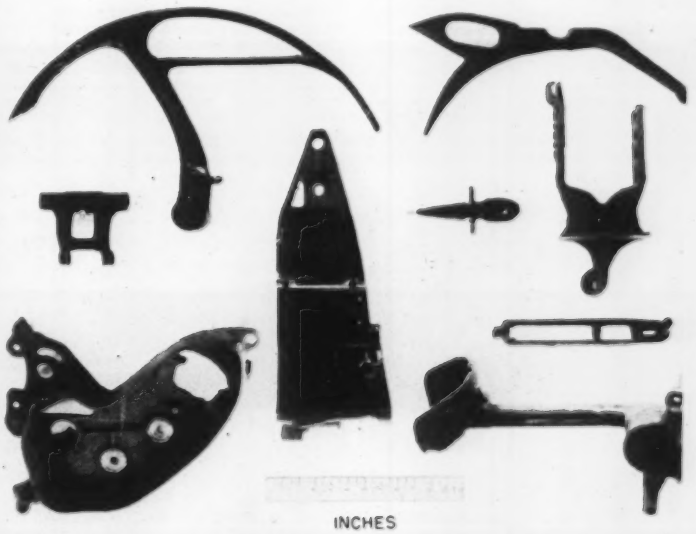

Fig. 16—Agricultural implement malleable castings

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REPRINTS AVAILABLE

REPRINTS of previous individual chapters in the series "Fundamentals of Steelmaking" now may be obtained by addressing Readers' Service Department, STEEL, 1213 W. Third St., Cleveland 13, O. Prices range from 20 to 75 cents per reprint. Subjects covered in previous issues include:

No. 1, Production of Electric Arc Furnace Steel; No. 2, Scrap Iron and Steel; No. 3, Production of Open Hearth Steel; No. 4, Production of Tool Steel; No. 5, The Art of Roll Pass Design; No. 6, Production of Bessemer Steel; No. 7, Production of Metallurgical Coke and Resultant Coal Chemicals; No. 8, Production of Plates; No. 9, Production of Hot and Cold-Rolled Strip and Sheets; No. 10, Production of Tin Plate; No. 11, Production of Structural Shapes and Rails; No. 12, Production of Butt and Lap Welded Pipe, Conduit and Electric Metallic Tubing; No. 13, Production of Pig Iron; No. 14, Production of Seamless Steel Pipe and Tubes; No. 15, Production of Stainless Steel; No. 16, Iron Ore—Its Mining, Beneficiation and Reserves; No. 17, Transportation and Handling of Iron Ore; No. 18, Production of Wire and Wire Rods; No. 19, Production of Gray Iron Castings; No. 20, Production of Steel Castings; No. 21, Production of High Alloy Steel Castings; No. 22, Production of Wrought Iron; No. 23, Production of Forgings; No. 24, Production of Semifinished Steel; No. 25, Production of Merchant Shapes.

Modifications of normal malleable iron, known as pearlitic malleables, have been produced for the past several years when wearing properties, accompanied by a reasonable amount of toughness are in demand. In these castings part of the carbon is in the combined form. Briefly, the ultimate strength varies from between about 60,000 to 90,000 psi, the elongation in the former averaging around 12 per cent and in the latter not more than 3 per cent. The type of material to be specified within the ranges depends upon the use to which the material is to be applied.

In general, pearlitic malleable has higher average yield point and ultimate strength and lower elongation than normal malleable iron. It machines less readily and has a higher indentation hardness. When compared with drop forgings and steel bar stock of identical Brinell hardness, pearlitic malleable may be machined in less time, with greater tool life, and at less cost. In comparison with forgings it also possesses the general advantages inherent in a cast part.

Fig. 17—Railroad fulcrum and breakhead cast of malleable iron

TABLE III
GRADES PROVIDED FOR IN ASTM SPECIFICATION A-220 TENTATIVE

	Grade #43010	Grade #48005	Grade #60003	Grade #70002
Tensile strength, min psi	60,000	70,000	80,000	90,000
Yeld point or yield strength, min psi	43,000	48,000	60,000	70,000
Elongation in 2 inches, min per cent	10	5	3	2
Typical brinell hardness number range	163-207	179-228	179-241	241-285

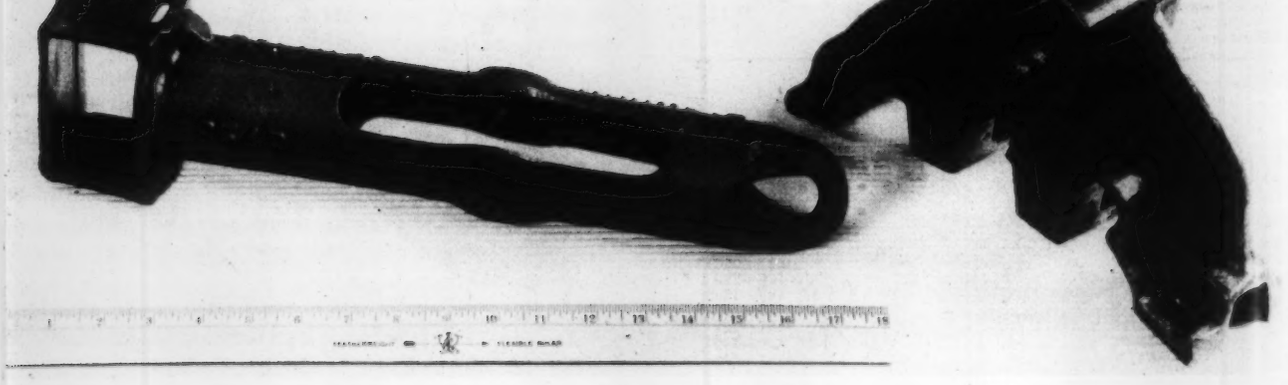
A minimum of draft is needed, interiors may be cored out as required, machine operations are reduced, and much metal is saved. Applications include use where rigidity and wear resistance are important factors, such as in gears, sprockets, air tools and wearing pads. (See Fig. 15)

The American Society for Testing Materials specification for pearlitic malleable iron castings, A-220 tentative, provides for four grades conforming to the minimum requirements as to tensile properties shown in Table III.

Some malleable iron producers also are engaged in the manufacture of the conventional type of malleable iron to which usually is added a small amount of copper and molybdenum. These alloy castings have found many applications, since they have a yield point of 40,000 to 45,000 psi, and an ultimate strength of from 58,000 to 65,000 psi, accompanied by an elongation of 15 to 20 per cent. Some other alloy combinations have also been used to advantage.

In the design of parts to be made of malleable iron, its high fluidity, uniform strength, and toughness make it possible to place metal in the exact section thickness in the exact locations desired. Interiors may be cored and many desired or required features incorporated in one casting with but little subsequent machining being involved.

By malleable casting use, as has been shown, it is often possible to conserve metal, machine tools and man-hours. From a strength standpoint, advantage may be taken of the fact that malleable iron's ratio (65 per cent) of yield point to ultimate strength is considerably higher than that of many materials of comparable elongation. Its high endurance ratio (55 per cent) indicates that it is much less susceptible



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It is impossible to "slip one over" on a lathe, milling machine, or planer. A defective tool breaks down—the dependable tool stays on the job. Kennametal—because its structure is inherently strong, free from flaw and defect, insures faster cutting speeds, more production per tool, fewer tool changes, and lower overall tool costs.

You can depend on Kennametal to machine hard steel—up to 501 Brinell—at high speed, without re-annealing and heat treating. You can depend on it to machine iron castings—hard, burned, and sandy—at faster rates, saving time and materials.

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Since then, the worth of your savings has been undermined—a bond, insurance, money in the bank has lost over half of its purchasing power. You cannot save for the future with assurance that your savings are secure. A manufacturer cannot set aside a reserve sufficient to pay for equipment that will keep him in business.

Fiat money—a "managed" currency—has always been mismanaged. Today's back-breaking taxes, practically unlimited government spending, and the uncertainty of your future are directly due to unsound money.

These conditions are the breeding grounds of Socialism . . . poisonous to enterprise and initiative . . . death-dealing to personal freedom. A redeemable gold coin standard has always been the only basis for sound, dependable money. Its restoration will prevent embezzlement of your savings—will encourage conditions favorable to personal enterprise—will insure human freedom.

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to progressive fracture than are many other metals. This is further demonstrated by malleable iron's high notch fatigue ratio of 33 per cent. Its consistency of strength in all directions results from the uniform structure which is produced by its unique heat-conversion process of manufacture.

From its earliest origin, malleable iron uses have progressed as have man's forms of transportation. For safety in transportation, tough and shock resistant materials are required. Early use included saddlery hardware such as buckles, bits, snaps and stirrups. Many such parts are still being made and used today. Next came malleable use for wagon and carriage parts. Hubs, skeins, bands, bolster plates, braces and brackets, whiffletree tips and hooks, flanges and steps were made of malleable iron, and still are.

Agricultural implements which although not strictly forms of transportation, are akin thereto, early relied upon malleable castings for many of their important parts. Then, and now, plows, cultivators, mowers, reapers, binders and spreaders incorporate malleables in their construction. (See Fig. 16)

In the development of the railroad industry, malleable castings also found wide use as brake heads and fulcrums, journal boxes and lids, draw bars, brackets, door fasteners, stake pockets, tie plates, rail braces, etc. Today the largest railroad uses of malleables are in brake heads and fulcrums (See Fig. 17), brake wheels, geared brake parts, and steam and air line connectors.

With the advent of automotive transportation, however, malleable iron entered what has come to be its greatest field of usefulness. Steering gear housings, differential cases, carriers and bearing caps, hubs, pedals and pedal brackets, motor truck spring hangers, mountings, rear axle housings and brake supports, all must stand severe service, yet permit of high-speed quantity manufacture. Malleables, being castings, can incorporate many required elements in one part and are easily and rapidly machined for their final use. Today 500,000 tons of automotive malleables are required annually.

The widespread and effective utilization of malleable iron, demonstrates it to be an ideal material for many and diverse applications, insuring economy in manufacture and dependability in service.

REFERENCES

American Malleable Iron-A Handbook, Malleable Founder's Society, Cleveland, 1944.

Malleable Iron Castings, Their Production and Use, J. H. Lansing, Cleveland Engineering, 1946.

It's New—It's Preformed

FOR MANY years lathe tool bits have been furnished in the same style and shape, it being necessary to grind for lead and point clearance, left or right hand, etc., before using. Now available is a lathe tool bit preformed of high speed steel with a Rockwell minimum of C66.

Lead and point clearance are already formed into the blank for both right and left hand and are said to save upwards of 85 per cent of original preparatory grinding time, plus more than 15 per cent saving of time on successive resharpening grinds. Lead clearance is fixed and positive throughout entire length of bit and by using it opposite side up left hand lead clearance is already for use.

Savings on Forming

SAVINGS of 30 to 50 cents per panel are realized in the forming of ball corners in standard press brakes made by Verson Allsteel Press Co., of Chicago. Additional benefits attributed to this method are improved product appearance, minimum spoilage, elimination of corner welding and finishing and substantially reduced handling.

Operations start with a square sheared blank. First operation is to trim developed corners in four strokes and the second operation is to draw the corners in the same number of strokes. The next operation trims cams after the draw (4 strokes). These first three operations are performed in a single Verson intermediate press brake equipped with three sets of dies.

Restriking the side flanges, the fourth operation, requires four strokes and is performed in a second brake equipped with a sectional restrike die. This consists of a pair of master ends and filler blocks to permit restriking any length within the brake capacity. Thus, a ball corner panel is completed in two handlings without special machinery.

Wires Resist Heat, Corrosion

ELECTRICAL conductivity of copper is combined with the heat and corrosion resistant properties of nickel in new nickel-clad copper wires now being made in diameters ranging from 0.010 to 0.005-inch in diameter. Said to be suitable for aircraft, industrial and laboratory equipment applications where product fabrication or end use is in high temperature or corrosive atmospheres, the wires are being produced by Syivania Electric Products Inc., Warren, Pa.

Stranded conductors of nickel-clad copper conductors are finding increasing applications in electrical leads for aircraft, electric furnaces, electric ranges and other home appliances, jet engines and a variety of laboratory and industrial equipment. Production of the new wire is controlled so that a uniform ratio of nickel to copper is maintained through a series of cold drawing operations in which the nickel-cladding ranges from 27 to 29 per cent.

During the process perfect bonding of nickel to copper is obtained, the company reports. Good workability and electrical characteristics are assured through heat-treating or annealing at frequent intervals and after the final drawing. Available under the brand name Kulgrid, the fine wire receives its final drawing at the speed of 2500 to 3000 fpm.

Effectively Resists Chemicals

IMPERVIOUS to concentrated hydrochloric acid and unaffected by dilute solutions of nitric and sulphuric acids is a new material, Hysol 6000, being manufactured by Houghton Laboratories Inc., Olean, N. Y. It is reported to withstand 50 per cent of caustic soda and to be odorless, tasteless, nontoxic and usable at temperatures of 230° F.

Fabrication may be close tolerances by ordinary metal or wood working machinery. Material is produced in rod, tube or sheet form and is said to have the additional advantage of being an electrical insulator. The company states that it is impervious to water and other solutions which normally cause insulating materials to break down.

In one installation, the material was used as a drain for a chromic acid plating tank. It is said to have been used in this service for over 9 months with no sign of failure or need for replacement.

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New ASTM Bar Specs Meet Users' Needs

Drawn up by technical representatives of leading consumers and producers, these standards on carbon and alloy steel bars, hot-rolled and cold-finished, include chemical ranges, check analyses, tolerances and general inspection requirements

By E. V. BENNETT*
Assistant Metallurgical Engineer
Bethlehem Steel Co.
Bethlehem, Pa.

Making a hardness test to determine compliance with new specs

COMPLETE new standards on carbon and alloy steel, hot-rolled and cold-finished bars have just been introduced in specifications developed by an ASTM committee comprising technical representatives of leading consumers and producers.

In compact form, these specifications include chemical ranges, check analyses, tolerances and general inspection requirements to meet needs of both large and small users.

The specifications result from the work of committee A-1 on steel, through its subcommittee XV on bar steels, of the American Society for Testing Materials, recognized as a leading specification-writing body.

Steel Product Coverage Broad — ASTM specifications for steel products cover a broad list of engineering and constructional materials such as plates of all kinds, structural shapes, concrete reinforcing bars, tubular products, forgings and castings.

Where bar products are concerned, ASTM until recently has had available only two bar specifications covering the chemical compositions of hot-rolled and cold-finished material. Materials engineers and buyers, and steel metallurgists as well, have persistently requested that ASTM develop adequate specifications for carbon-steel and alloy-steel bars.

Throughout recent years, possibly 75 per cent of carbon and alloy bar tonnage has been ordered to standard chemical ranges with no other stated requirements. Other questions such as check analysis, tolerance and general-inspection requirements are not specified, and in those cases AISI steel product manuals usually are referred to as a guide.

Scope of Specs.—Scope and thor-

* The author is chairman of ASTM Subcommittee XV on bar steels.

Table I—Summary of ASTM Carbon Steel Bar Specifications

Specification Title and ASTM Designation	Chemical Requirements: Regular Open Hearth	Chemical Requirements: Free-Cutting Open Hearth	Size Limitations and Diameters	Mechanical Properties: Tensile Strength Minimum	Yield Point Minimum	% Elongation in 8" Minimum	% Elongation in 2" Minimum	Reduction Minimum
Hot-rolled carbon-steel bars ASTM A 107-49T	1008-1010-1015 1016-1020-1022 1025-1030-1035 1040-1045-1050 1055-1060-1070 1080-1095 Bessemer B1010	1115-1117 1118-1120 1137-1141 1151 Bessemer B1111-B1112 B1113	All sizes	None specified				
Medium-carbon-steel bars subject to mechanical property requirements ASTM A 306-49T	All grades C—Unspecified Mn—0.90 max P—0.040 max S—0.050 max Si—0.10 min	None	All sizes	Grade 70—70/85,000 Grade 75—75/90,000 Grade 80— 80,000	36,000 38,000 40,000	14 12 10	18 16 14	None specified
				(Added bend test required for each grade)				
Heat-treated carbon-steel bars ASTM A 321-49T	C—0.50 max Mn—0.60/0.90 P—0.04 max S—0.05 max Si—0.15/0.30	None	4" and under Over 4" to 7", incl.	90,000 85,000	55,000 50,000	.. ..	20 20	40 40
Cold-finished carbon-steel bars and shafting ASTM A 108-49T	1008-1010-1015 1016-1018-1020 1022-1025-1030 1035-1040-1045 1050-1095 Bessemer B1010	1115-1117 1118-1141 1144-1151 Bessemer B1111-B1112 B1113	All sizes	None specified				
Stress relief annealed cold-drawn carbon-steel bars ASTM A 108-49T	None	1137	9/16" and under	100,000	80,000	..	15	40
			Over 9/16" to 1¼", incl.	95,000	75,000	..	15	40
			Over 1¼" to 2½", incl.	90,000	70,000	..	14	40
		1141	9/16" and under	105,000	85,000	..	12	40
			Over 9/16" to 1¼", incl.	100,000	80,000	..	12	40
			Over 1¼" to 2½", incl.	95,000	75,000	..	12	40
		1144	9/16" and under	105,000	85,000	..	12	35
			Over 9/16" to 1¼", incl.	100,000	80,000	..	12	35
			Over 1¼" to 2½", incl.	95,000	75,000	..	12	35
		1151	9/16" and under	105,000	85,000	..	10	35
			Over 9/16" to 1¼", incl.	100,000	80,000	..	10	35
			Over 1¼" to 2½", incl.	95,000	75,000	..	10	35

Table II—Summary of ASTM Alloy Steel Bar Specifications

Specification Title and ASTM Designation	Chemical Requirements	Size Limitations and Diameters	Mechanical Properties: Tensile Strength Minimum	Yield Point Minimum	Elongation % in 2" Minimum	Reduction Minimum	Brinell Hardness
Hot-rolled alloy-steel bars ASTM A 322-49T	1330-1335-1340-2317-2340-2515 3130-3135-3140-3141-3150-E3310 4017-4023-4024-4027-4028-4032-4037-4042-4047-4063-4068-4130-4140-4142-4145-4147-4150-4320-4340-4615-4620-4640-4815-4820-5132-5135-5140-5145-5147-5150-5152-6150-6152-8620-8630-8635-8640-8641-8650-8653-8655-8720-8740-8745-8750-9255-9260-9261-9262-E9310-9440-9445	All sizes	None specified				
Heat-treated alloy-steel bars ASTM A 286-46T	Class A	2½" and under	105,000	80,000	20	50	212/269
		Over 2½" to 4", incl.	100,000	75,000	20	50	
		Over 4" to 7", incl.	95,000	75,000	20	50	
(Carbon not specified)	Class B 2300-3100-4100-4300-8700-9800	2½" and under	125,000	105,000	16	50	235/311
		Over 2½" to 4", incl.	115,000	95,000	16	45	
		Over 4" to 7", incl.	110,000	85,000	16	45	
Alloy-steel rounds, suitable for oil-quenching to end-quench hardenability requirements ASTM A 304-47T	1340H-2340H-3140H-3150H-4042H-4140H-4150H-4340H-4640H-5140H-5150H-6150H-8640H-8650H-8740H-8750H-9440H-9840H-9850H	1" to 4" rounds	None required but hardenability specified for each analysis				
Cold-finished alloy-steel bars (designation in process of preparation)	2317-2515-3120-3130-3135-3140-3150-E3310-4023-4024-4037-4042-4063-4068-4130-4140-4142-4145-4150-4320-4340-4615-4620-4640-4815-4820-5120-5140-5150-6120-6150-8620-8630-8640-8653-8655-8740-8742-9260-E9310	All sizes	None specified				

oughness of the committee's work are reflected in the eight bar specifications. Requirements of the standards are summarized in Tables I and II. Specifications for carbon steel bars include: Hot rolled (A 107-49T); medium carbon steel bars subject to mechanical property requirements (A 306-47T); cold finished bars and shafting (A 108-49T); stress-relief annealed cold drawn bars (A 211-49T).

Alloy steels are equally well covered by four specifications: Hot rolled (A 322-49T), heat treated (A 286-46T), rounds suitable for oil quenching to end quench hardenability requirements (A 304-47T). The specification on cold finished alloy steel bars is in the course of preparation. Alloy steels are normally not supplied to hot-rolled mechanical properties. This accounts for the omission of a specification along these lines in Table II.

Besides chemical and mechanical requirements summarized in the two tables, the respective specifications where appropriate, cover bending details, requirements on straightness, permissible variations in dimensions, marking and acceptable inspection procedure.

Membership of Committee Diverse—Subcommittee XV was greatly expanded a few years ago to include 26 consumers and general-interest members, 19 representatives of producers of carbon and alloy steel bars. The consuming group includes metallurgists or materials engineers from six manufacturers of electrical equipment, five cold finishers; five miscellaneous manufacturers of bearings, chain, bolts, saws and business machines; three railroads; three agricultural implement makers; and four general-interest members. Diversity of membership insures full discussion of all phases of a specification before approval.

This diversity of membership insures complete discussion of all phases of a specification before approval. Rules in effect by the society make a letter ballot on each specification mandatory and all negative notes receive full subcommittee attention before final approval of the specification by the society.

Advantages to User—The modus operandi of the society gives the user of ASTM standards two advantages: First, the representation from producing and using interests assures a complete examination of both sides of the specification-writing picture; and secondly, society procedure is such that specifications must "season" for a sufficient period before being advanced to standard status.

There is also a further angle which, while not of primary importance to the engineer, certainly is of major interest to the buyer and the cost estimator. As far as practicable for general-purpose applications, ASTM specifications are usually recognized by the trade as incorporating standard practices.

The special-purpose specifications that involve unnecessarily restrictive requirements are, in general, avoided. However, where unusually stringent requirements are necessary for some specific end-use, the standards serve a widespread need in providing a base on which supplementary testing or more restricted requirements can be imposed.

The ASTM specifications should be of particular interest to the following types of steel consumers:

(a) *The large user of steel* who usually employs a competent metallurgical staff. The metallurgist wisely reviews current ASTM standards and utilizes them *in toto* or uses those portions which fit his company's particular needs and end products. Ultimately this information is usually incorporated into complete purchasing department specifications.

(b) *The small purchaser* who has no available trained metallurgical personnel. ASTM standards provide a convenient and probably the best available guide today in ordering steel.

(c) *The steel warehouse* is confronted with the problem of stocking steels for miscellaneous end usage. ASTM provides a useful standard, universally understood and accepted by industry in general. It is also frequently desirable to advertise that available warehouse stocks meet certain ASTM standards.

(d) *Export business* usually requires a "meeting of minds" on some commonly accepted standard such as the ASTM specifications.

Specifications are covered in the 1949 book of ASTM standards, part 1, covering ferrous metals. They are also printed in separate pamphlet form. Society headquarters are at 1916 Race St., Philadelphia 3, Pa.

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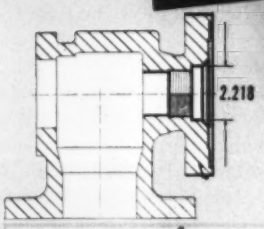

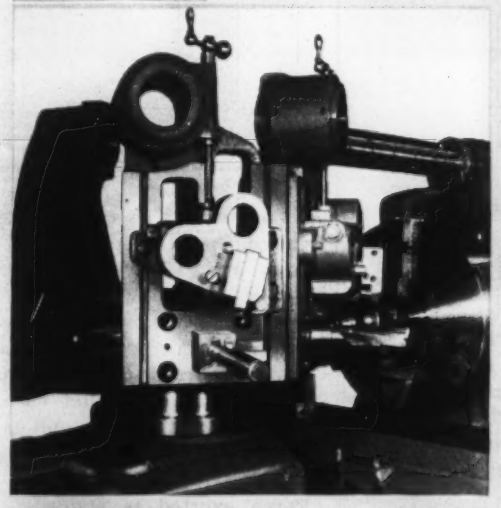

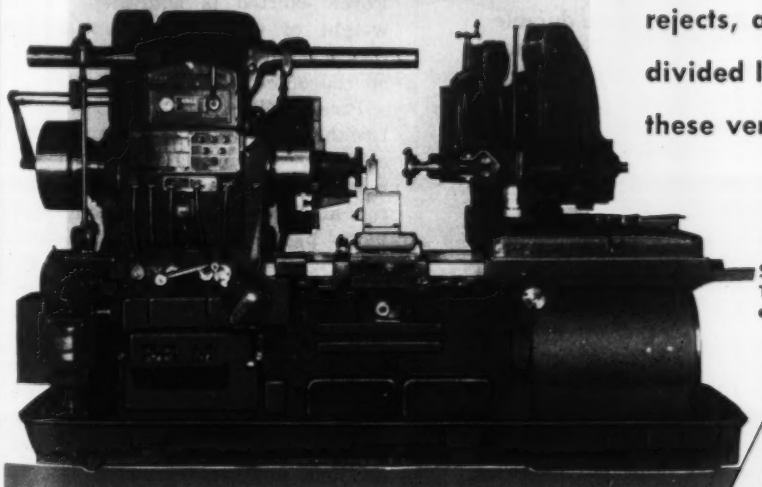

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$1.50 Per Ton Cleaning Bolts 7/8" and Over

At St. Louis Screw & Bolt Co., St. Louis, Missouri

Through a direct saving of $1.50 to $5.00 per ton in the cost of removing scale from hot forged bolts, this Wheelabrator Tumblast repaid its entire cost in approximately two years time. Wheelabrating reduced acid pickling requirements at St. Louis Screw & Bolt Co. and immeasurably simplified the cleaning operations. Only those pieces which due to their size or nature cannot be Wheelabrated are now pickled. This results in lower operating costs by decreasing cleaning and handling time.

Forgings are cleaner, making plating and galvanizing easier and more durable without the necessity of subsequent surface treatment. 300 pound loads are throughly cleaned in four minutes — a fraction of the time formerly required by pickling.

You can compare your present cleaning methods with Wheelabrating without cost or obligation. Just send samples of your work to American Wheelabrator's testing laboratory and make them prove the cost-reducing advantages of Wheelabrator cleaning. Write today for full information.

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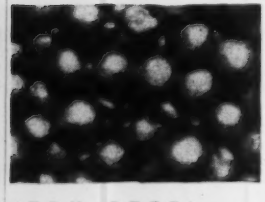

TRU-STEEL

No. 230 at Mag. 10X After 1500 Passes

SAVES Storage Space, Transportation Costs, Machine Maintenance, Loading Time, Replacement Parts.

A test was conducted for a period of 69 wheel hours at Casting Service Company, LaPorte, Indiana with the following results. Only 7.14 lbs. of **TRU-STEEL** Shot was used per hour to do the work of 34.7 lbs. of chilled iron. Nearly a ton less **TRU-STEEL** was used in the 69 hours making large savings in initial cost as well as handling, storage and transportation costs. Order a supply of **TRU-STEEL** today.

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WHEELABRATOR & EQUIPMENT CORP.

509 S. Byrkit St., Mishawaka 5, Ind.

WORLD'S LARGEST BUILDERS OF AIRLESS BLAST EQUIPMENT

Press Has Triple Action

With a 10 x 30-foot die area, a huge press being built will have a draw of 5000 tons

HARD-to-work sheets of high strength, lightweight aluminum alloys and stainless steel, can be fabricated in larger sizes with an 8000 ton triple action hydraulic press, said to be the largest metal drawing press in the world, now being built. Actual dimensions of the die space area will be 30 feet 4 inches from left to right and 10 feet from front to back. Reputed to cost approximately $750,000, it will have bed and crown of single-piece all-welded construction. Tie rods and main cylinders are forgings and the rest of the press will be made of steel castings.

Being built by Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa., for Lockheed Aircraft Corp., Burbank, Calif., the giant piece of equipment is said to have almost twice the tonnage and more than twice the die area of the largest similar press now in operation. It will have a 5000-ton draw, plus 3000 ton blank-holder, with a cushion pressure of 2000 tons.

Convincing Proof—Still not convinced that this press is of tremendous size? Its superstructure will tower 36 feet and the base will extend 12 feet below the flooring. Press will be supported by a 40-foot square steel-reinforced concrete foundation. With the underground base, it will weigh more than 3½ million pounds, or about as much as a large freight locomotive and 47 steel boxcars. Force exerted is equivalent to the weight of a battle cruiser or 5330 average-weight automobiles stacked on top of each other.

Press will make it possible for Lockheed to fabricate parts which could not previously be made, besides meeting engineering design demands for airplanes with increasing speed and higher stress requirements. It is said that present presses with limited working dimensions and tonnages have made it necessary to build parts in such small sizes that they need considerable riveting and joining, thus adding weight to the parts. Press will make it possible to handle all types of alloys in all gages and sections now contemplated in engineering and design trends. It is reported that the new 120-inch wide aluminum sheet may be pressed in the new machine.

Flexibility Is Key Note—Feature of the king-size machine is its extreme flexibility. The manufacturer states that this is the first press of

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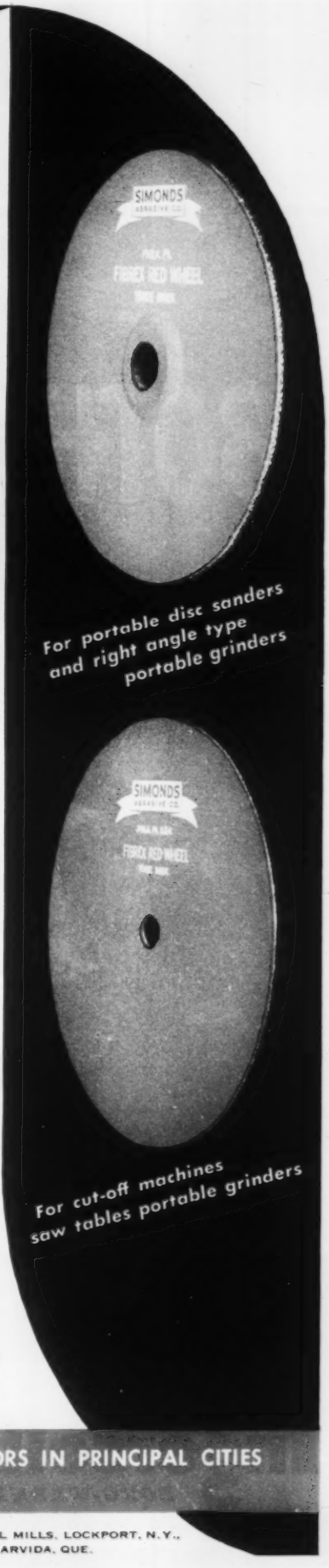

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FIBREX® RED WHEELS

TRADE MARK

Where speed counts on the job, Fibrex Red Wheels are your answer. Tough — fast-cutting — durable — they head right into the work and actually *cut* away excess metal, faster by far than grinding it down. And, using the *same* Fibrex Red Wheel you can follow through immediately with your smoothing and finishing-up operations.

Try these sensational new abrasive tools. In straight wheels for cutting off brass, bronze, copper tubing and aluminum . . . depressed center wheels for cleaning up ragged surfaces and grinding welds especially on stainless steel. Send now for free Bulletin ESA 186.

SIMONDS ABRASIVE COMPANY, PHILADELPHIA 37, PA. DISTRIBUTORS IN PRINCIPAL CITIES

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DIVISION OF SIMONDS SAW AND STEEL CO., FITCHBURG, MASS. OTHER SIMONDS COMPANIES: SIMONDS STEEL MILLS, LOCKPORT, N.Y., SIMONDS CANADA SAW CO., LTD., MONTREAL, QUE. AND SIMONDS CANADA ABRASIVE CO., LTD., ARVIDA, QUE.

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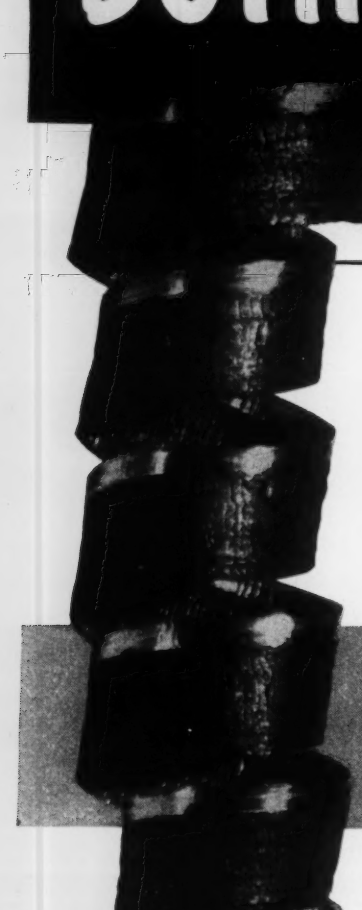
provides trees with an armor of protective BARK

BOTH give protection!



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provides carbon steel sheets with a protective armor of SOLID STAINLESS STEEL

At Borg-Warner's Ingersoll Steel Mills, we produce sheets of a remarkable steel that gives real stainless protection on the contact side. The actual photograph (at left) of a machine cutting, greatly enlarged, shows how perfectly the cladding of 20% solid stainless is bonded to an 80% backing of carbon steel to form—

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The uses are widespread . . . the cost considerably lower than for the solid stainless metal. It will pay you to investigate the fabricating advantages and economies of IngAclad.

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ENGINEERING B-W PRODUCTION

its size to be made with flexible cycle controls so that it may be used for a variety of operations. It has been designed to change sequence of operations from single to double action, to change speed and to change pressure, all with pushbutton control. It has also been designed to facilitate removal of parts difficult to run and remove from the dies.

Power is supplied by one 75 hp and two 250 hp motors. It may be run by one man, or from four stations, as a set of operation controls are to be installed on each corner of the press. Initial construction is under way at the Birdsboro plant, the schedule calling for delivery of the completed press by fall.

Electrode Nips Shutdown

Welding repairs broken crane casting in steel plant; lost service time held to minimum

CRASHING violently into a main line train with such impact that its movable frame was broken in several places, a trainload of 200 tons of steel switched in error threatened to at least partially shut down a French steel mill at Longwy, France. Since this frame held the motor as well as the transmission and control equipment, the entire unit was crippled at a time when the mill was operating in a desperate effort to keep up with the postwar demands of industry to reconstruct the country's economy.

Production being seriously handicapped with this crane out of commission, it appeared that the accident would be costly as the casting was exceptionally large. Because of the time involved, it was not feasible to make a mold and cast a replacement. Welding was considered, but it was problematical whether a weld of this size would withstand the strain of heavy usage to which the crane is put.

It was decided to use a new high-tensile strength low temperature welding electrode which was being introduced in France by Eutectic Welding Alloys Corp., New York. Electrode's chief virtue was that the job could be welded without preheat, because the metals in the electrode surface alloy with the base metal instead of fusing at high heats. In the initial preparation for the weld the cracks were V'd deeply to expose the broadest possible surface. Multiple beads were run with a 5/32-inch EutecTrode at 125 amp, reverse polarity, direct current. Additional layers of metal were applied in deposits 2 inches long, the arc being played on the weld metal to avoid fusion or

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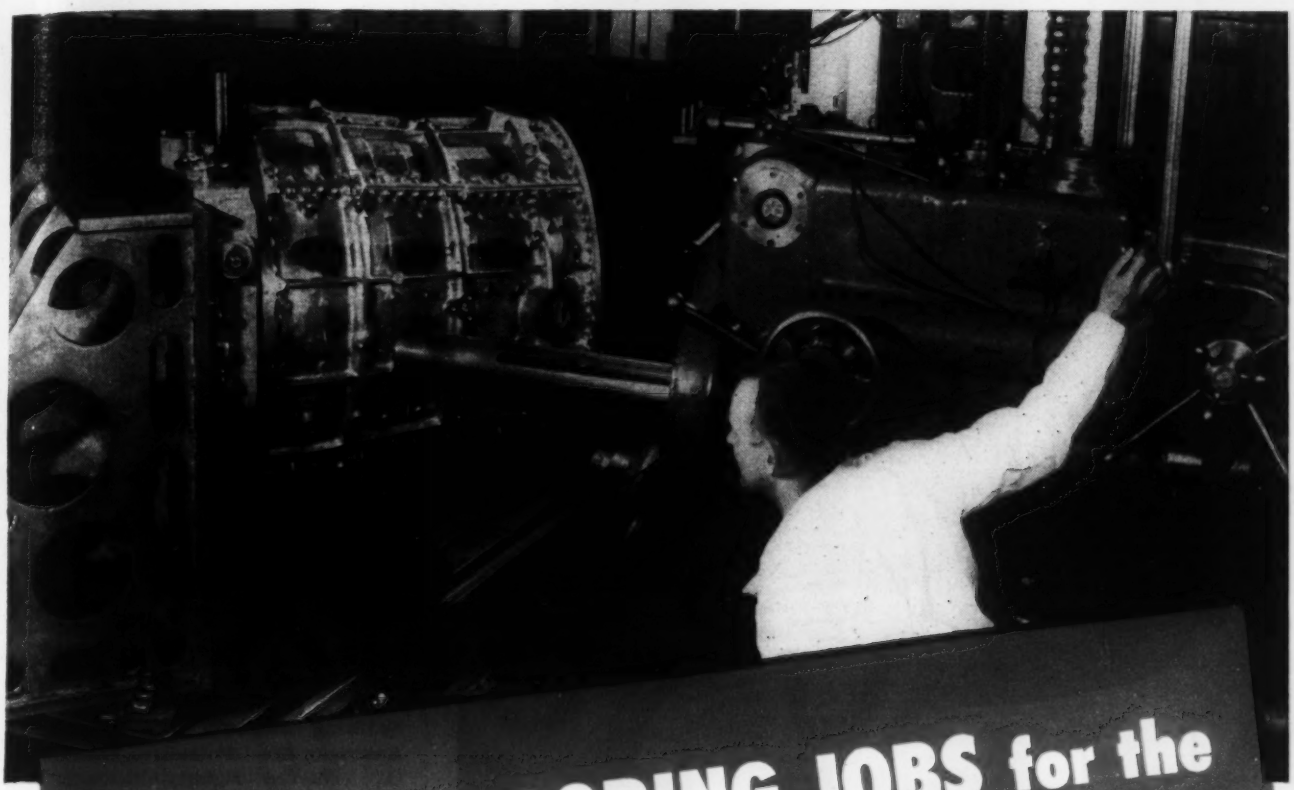

PRECISION BORING JOBS for the Famous "ORENDA" Jet Engine

The A. V. Roe Company at Malton, Ontario, find Universal Boring Machines, which are now built by The Bullard Company, ideal for varied machining operations on this exacting work.

The above illustration shows the machining of a Compressor Housing, one of many operations which these machines accurately perform.

Particular advantages of the Bullard-Universal Boring Machines are their versatility and simplified right hand operation.

Close tolerances are absolutely essential in the building of this Jet Engine, and here again Bullard-Universal gives that desired accuracy.

Investigate these machines to increase production and accuracy on precision work

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Good News —

NOW, all Johnson XLO Music Spring Wire is made from imported, improved Swedish rod. Johnson researchers plus the resources of Swedish steelmakers have developed an electric furnace steel, with closely controlled analysis, which is being used exclusively in Johnson Music Spring Wire. The result—more uniformity and added fatigue.

This quality advance is in line with the Johnson policy of giving something better whenever possible.

Ample stockpiles warrant a continuous supply.

JOHNSON

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puddling of the cast iron.

About 900 electrodes were used to repair the casting, the job requiring 180 hours of welding time. To make sure that the weld would withstand any reasonable load that might be applied, the 5-ton crane was tested under a 20 per cent overload before being put back in service. Because the low heat of the repair prevented grain growth and other weakening effects usually resulting from high heat, and due to the 60,000 psi tensile strength of the electrode, no failure of any kind was detected. The crane was put back into service at once with only a minimum of service time lost.

Increases Boring Capacity

PRODUCTION increase of 50 per cent has been attributed to the installation and use of a special diesel wheel boring and facing machine by one of the largest diesel locomotives manufacturers. The machine, built by King Machine Tool Division of American Steel Foundries, Cincinnati, O., achieves rigidity through the use of a massive fixed rail, which carries the oversized boring ram and hydraulic feed cylinders.

Ram uses a square type construction which is said to permit accurate alignment and easy adjustment of the four large gibs. Ram cycle is fully automatic and may be set to rapid traverse to the work, rough bore at one feed, finish bore at another feed, from a radius at a third feed, then dwell and rapid traverse out of the work. A special motor operated power chuck holds the wheel securely and speeds up loading and unloading operations.

Separate hydraulic power unit for actuating the boring head is located on the side of the machine. An oversized side head assembly reportedly permits full use of carbide tooling even while extended to machine the hub details.

Widens Electrical Knowledge

FUNDAMENTALS of construction and operating principles of all major types of electrical instruments are described in the revised edition of "Manual of Electric Instruments", available from Meter and Instrument Division, General Electric Co., Schenectady, N. Y. Although prepared primarily for use in schools, the manual is also expected to see wide use by men in industry who wish to gain familiarity with the electric instruments with which they work. Its 17 chapters explain the fundamentals of such instruments as thermocouples, synchroscopes, frequency meters, etc.

New Books

Foundry Practice

Foundry Science, by Harry A. Schwartz, manager of research, National Malleable Steel Castings Co.; cloth, 286 pages, 6¼ x 9¼ inches, published by Pitman Publishing Corp., New York; available from STEEL, Penton Bldg., Cleveland 13, O., for $6.50.

Directed to engineering students contemplating specializing in foundry practice and to the foundry engineer feeling need for a refresher course, this book is designed to interpret the findings of the scientist to the industrial technologist. Serving to correlate work in the fundamental sciences with the processes encountered in practice, it is useful as a refresher on theoretical matters. Described in sequence are the metallurgical operations of the foundry, presented in such a manner as to demonstrate that the industry, like all other engineering industries, is governed by fundamental scientific facts.

Order of presentation begins with the fundamentals of the properties of matter and energy and takes subjects in their order in the foundry, not in that of scientific development. Additional attributes of the book include a section on supplementary reading, divided according to the chapters of the book, and a complete and extensive subject index.

Resistance Welding

Resistance Welding in Mass Production, by A. J. Hipperson and T. Watson; cloth, 278 pages, 5½ x 8¾ inches; published by Iliffe & Sons Ltd., London, England; available from STEEL, Penton Bldg., Cleveland 13, O.

Welding and production engineers, designers and students of welding and engineering production will be interested in this book. Reference is made to design and production requirements, both from the point of view of the design of component parts for optimum results from welding and the design of jigs and tools for the correct use of the processes under mass production conditions.

Advances made in the process during the war years showed that resistance welding offered many possibilities in the efficient mass production of fabrications in metal. These findings were, to an extent, responsible for this book. Content ranges from the first principles of each process to its scientific application in mass production. Subject matter includes selection of the process, the various processes—pot, projection, seam, flash and butt welding and hot riveting, control equipment for

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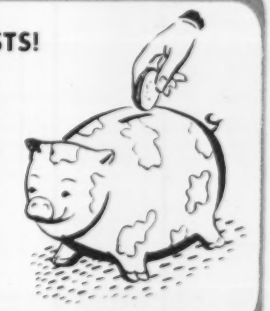

To every manufacturer already using a passivated zinc finish, Luster-On Utility-15's amazing economy is the big news. With this remarkable new product, you can replenish with the original solution . . . dilute up to 10 times . . . use the same solution for manual or automatic operation — features never before possible with a zinc bright dip. Savings run 50% and even more!

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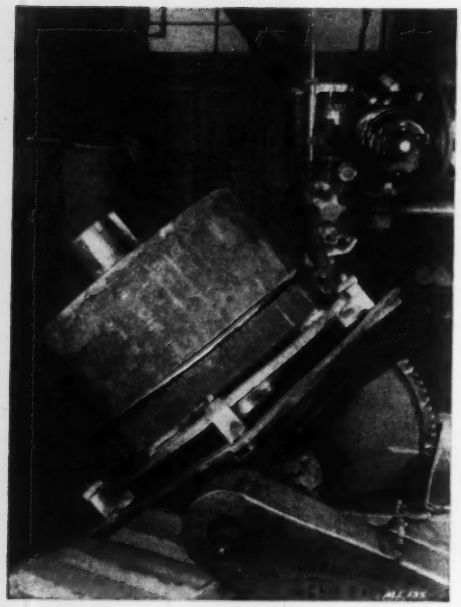

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Consult us about your requirements—no obligation, of course. The Van Dorn Iron Works Co., 2685 East 79th St., Cleveland 4, Ohio.

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Profusely illustrated; describes the many advantages of Weldments, and Van Dorn's extensive facilities.

resistance welders, recommended machine settings, testing and inspection of welded joints and resistance welding costs. A bibliography and index are included.

Coking Industry

Coal, Coke and Coal Chemicals, by Philip J. Wilson Jr., research associate, Carnegie-Illinois Steel Corp. and Joseph H. Wells, senior fellow, Carnegie-Illinois Steel Corp. Fellowship, Mellon Institute; cloth, 509 pages, 6½ x 9¼ inches; published by McGraw-Hill Book Co. Inc., New York; available from STEEL, Penton Bldg., Cleveland, O., for $8.

As there are a limited number of books available on the coking industry, the authors have attempted to remedy the deficiency by means of this book. It constitutes a modern description of present practice in the industry, making liberal use of photographs and diagrams to present a complete treatment of the various subjects. Subjects of fuels and combustion are reviewed first, followed by a discussion of coal, its origin, classifications and properties, preparation of coal, coking processes and recovery of the coal chemicals.

Each phase of the industry is systematically covered; other coal carbonization processes, gas retorts and lower temperature coking processes are described. The appendix includes section on abbreviations, bibliography, list of plants for the carbonization of coal in this country and a list of visual aids on the subject.

Blast Furnace Slag

Hochofen-Schlacke (*Blast Furnace Slag*), by Fritz Keil; 346 pages, 6.4 x 9 inches; published by Verlag Stahleisen, Dusseldorf, Germany.

Much more complete than the older book by Guttmann on the same subject, this book begins by describing slags of all types and compositions and emphasizing the differences between the properties of blast furnace slags and those of other slags. In a section on production and utilization of quickly cooled slag is information on the production of granulated slag, its use for cement, for brickmaking and for making of slag-pumice stone used in lightweight bricks and concrete.

Third section deals with slowly-cooled chunky slag, its selection and crystallization. Miscellaneous products and uses of blast-furnace slag are also covered, along with the use of slag wool. Included in the volume are 107 illustrations and 79 tables. Extensive bibliography and 30 pages of German laws and ordinances covering the use of slag products are also between its covers.

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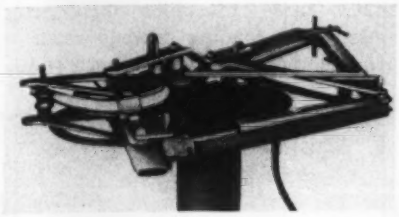
New Products and Equipment

Hydraulic Bender for Pipe

Pipe, bars and angle iron may be bent with the hydraulically operated universal bender introduced by Hossfeld Mfg. Co., Winona, Minn. The No. 2 bender for which the hydraulic unit is designed is unchanged; unit may be easily attached to any such



model now in use. It consists of motor, pump, cylinder and foot control which leaves both hands free to manipulate material being processed.

Capacities are the same as those for the conventional type machine. Full 180 degree bends can be made on standard pipe up to and including 2-inches. Cylinder returns the swinging frame to starting position while operator feeds the stock.

Check No. 1 on Reply Card for more Details

Porosity-Free Castings Produced

Castings which are relatively free of porosity are produced by the model 400-M self-contained, all-hydraulic die casting machine, offered by Hydraulic Press Mfg. Co., Mt. Gilead, O. For making castings in magnesium, aluminum or base copper alloys, this machine has a high sustained injection

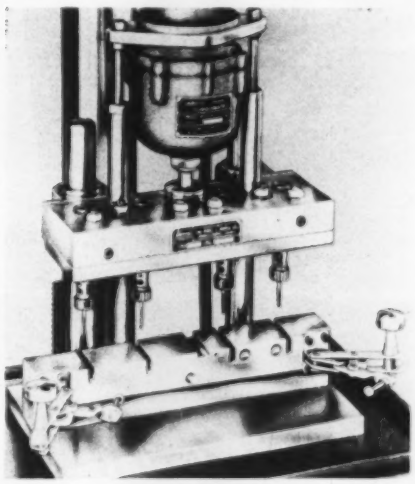
pressure through the cold chamber injection system which confines pressures within the die cavity to reduce porosity. Injection plunger is returned hydraulically. Injection speed is governed through the control of the rate of discharge of the oil ahead of the injection piston.

Hydraulic die clamp for "live" positive die closing and sealing of the die halves consists of a double-action ram. Both die opening and closing are free of shock, adding to die life and reducing casting scrap loss. Die openings are controlled through electric timers. Automatic control of die movement clamping and injection plunger movement is provided. Maximum production is 125 shots per hour and clamping pressure is 400 tons.

Check No. 2 on Reply Card for more Details

Tapping in Multiples

Charles L. Jarvis Co., Middletown, Conn., is announcing the Multi-Tapper for multiple tapping and drilling in mass production lines. Device features a silent roller chain to transmit power from the Torquomatic



drive unit—a chain which withstands constant friction and which can absorb the shock loads due to continuous forward and reverse action.

Result is reduced wear of gears, quieter operation and increased production. Number of spindles is limited only by the size of tap or drill and the work.

Check No. 3 on Reply Card for more Details

Stronger Magnetic Pulley

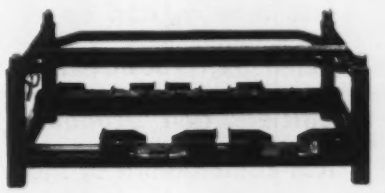
Increased magnetic power, lighter weight and greater structural strength are features of improved permanent magnetic pulleys offered by Eriez Mfg. Co., Erie, Pa. These magnetic separating devices remove tramp iron from various types of materials. Pulleys are made in sizes to carry 12, 15, 18, 20, 24 and 30-inch belts of rubber, leather, canvas, stainless steel sheet or any other nonmagnetic material.

New design gives uniform flux distribution from end to end of the pulley. Dead metal and total weight are reduced, but Alnico magnet weight is increased. Larger magnets give increased pull and holding power, in some models as much as 50 per cent more. Nonmagnetic material flows off the tangent into a bin. Ferrous inclusions stay on the belt until carried under and out away from the magnetic field where they drop into a separate bin.

Check No. 4 on Reply Card for more Details

Racks for Shipping

Box car loading is simplified with portable rack equipment manufactured by Equipment Mfg. Inc., 12550 Hoover Rd., Detroit 5, Mich. Rack



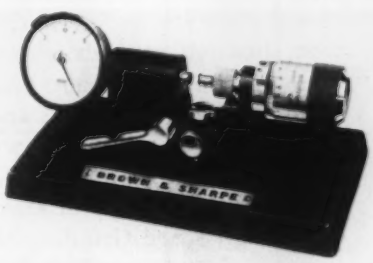
systems consist of welded tubular racks fabricated for unitized handling of any part. Special framing, adjustable supports and bulkheads complement the equipment.

Racks are fast-stacking, self-locating types which permit handling by lift truck with important man power savings. System is designed for shipment of high volume assembly parts between plants. Advantages include elimination of separate packing cost of individual parts and protection of parts.

Check No. 5 on Reply Card for more Details

Indicating Bench Micrometer

No. 245 indicating bench micrometer, offered by Brown & Sharpe Mfg. Co., Providence 1, R. I., may be used in three different ways: From



0 to ½-inch by 0.0001-inch, directly from the micrometer thimble; it may, as a comparator, be set without additional standards with readings to 0.0001-inch taken from the dial gage; it also measures by 0.0001-inch directly from the dial gage with micrometer set at the nearest 0.001-inch of the measurement.

Micrometer has an adjustable measuring pressure from 8 ounces

SNAG FASTER for LESS MONEY!

K-372

You can remove more metal in less time, for less money, and do a better job, if you have the efficient and economical combination of the right snagging wheels and the *right* machines.

Experience proves that old machines converted to higher speeds are usually costly, often dangerous, and seldom meet the exacting requirements for quality of workmanship and quantity of output that are necessary to a competitive position today. Electro Field Engineers know the right combination of Electro *HIGH-SPEED* resin-bonded Grinding Wheels and the right machine for the scheduled job.

•

Why not accept their help? Their cooperation will cost you nothing. It will place you under no obligation. Just tell us with whom in your organization, our Electro Field Engineer may talk; and if you request it when you write, phone or wire, we will gladly send you free a copy of our 64-page High Speed Grinding Manual. Electro Refractories & Alloys Corporation, 344 Delaware Ave., Buffalo 2, N. Y.

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High Temperature CEMENTS

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REFRACTORIES for Chemical and Ceramic Industries

ELECTRO-CARB (Silicon Carbide) ABRASIVE GRAIN

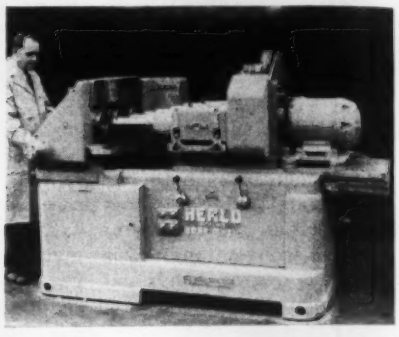
Electro *HIGH-SPEED* GRINDING WHEELS

to 2 pounds which remains constant when set. Unit is equipped with tungsten carbide tip to measuring surfaces and precision ground threads. Anvil movement is in a straight line. Retractor lever withdraws anvil for rapid repeat measurements. Zero adjustment is rapidly made.

Check No. 6 on Reply Card for more Details

End Loading Machines

Heald Machine Co., Worcester 6, Mass., is offering two end loading Bore-Matic machines, models 425 and 426. These machines differ from other end loading models made by the company in the 221 and 321 sizes



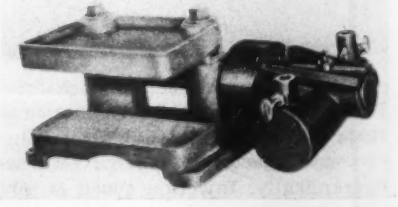
in that fixture and work are mounted on the bridge while the boringheads and motors are located on the machine table.

Model 425 (illustrated) is arranged with a stationary fixture; the model 426 is similar with the single exception that the latter has an indexing cross slide on the bridge which allows three work pieces to be loaded while three others are being borized.

Check No. 7 on Reply Card for more Details

From Hand to Air Operations

Standardized fixtures made by QC Engineering Products Division, Pearson Inc., 2842 W. Grand Blvd., Detroit 2, Mich., may be converted from hand to air operation with applica-



tion of a power unit also made by the company. Fixtures may be converted in 10 minutes with no machining required and only a screw driver and socket wrench necessary. Should air pressure fail, all movement is impossible in either direction until the pressure is resumed. Air consumption is low and equal power is

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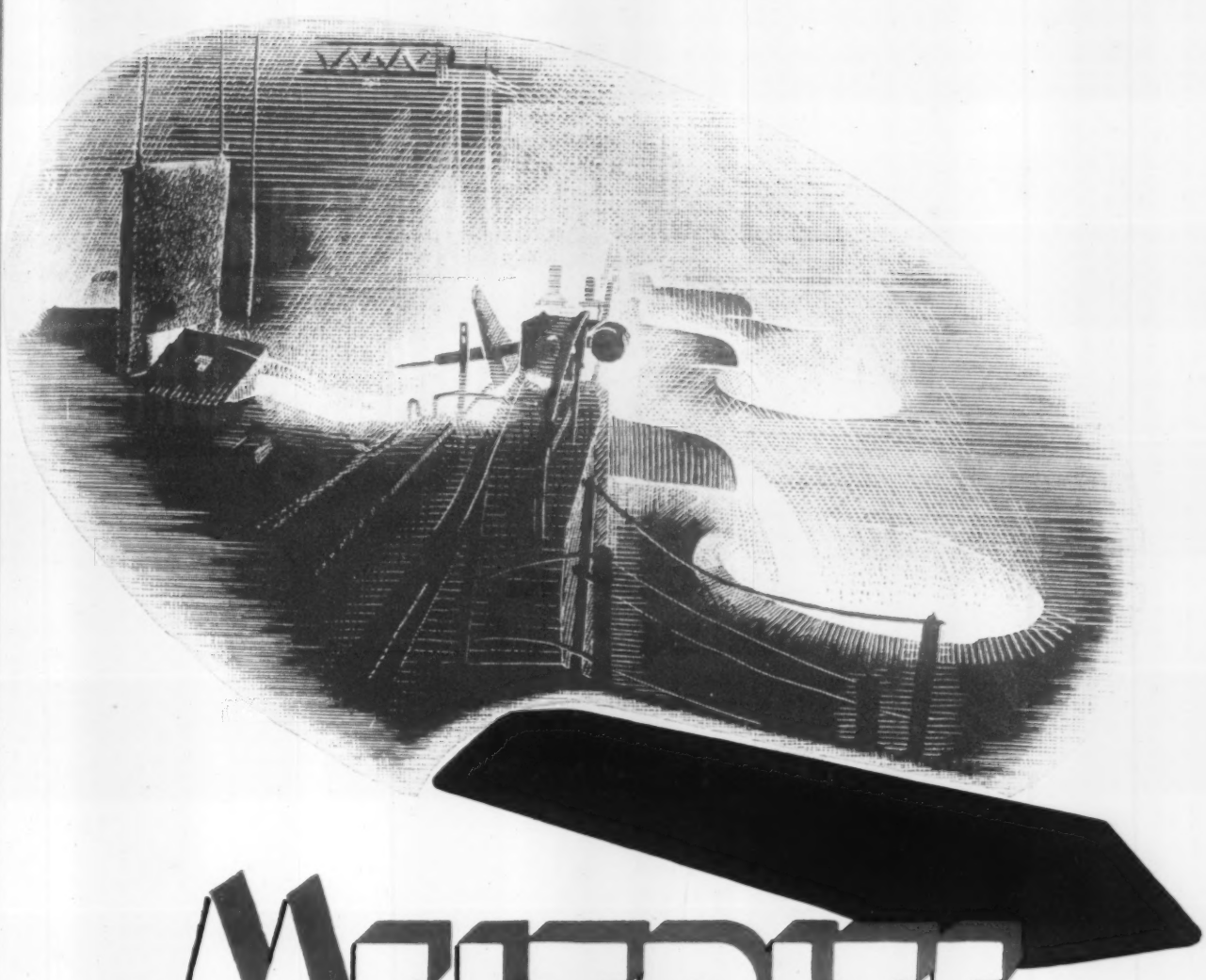

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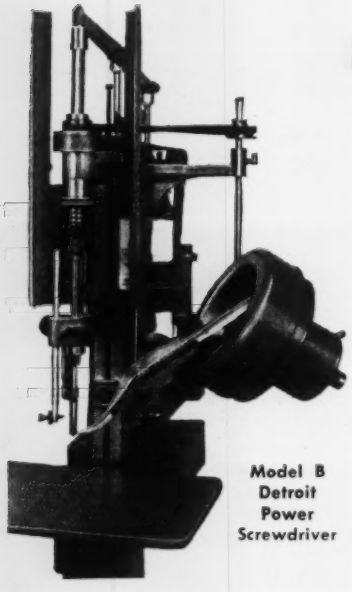

Model B Detroit Power Screwdriver

to your
PRODUCTION SCREWDRIVING PROBLEMS

It's alive with illustrations and descriptions of invaluable time-saving aids: **POWER SCREWDRIVERS** that drive all types of screws as fast as one a second, without stripping of threads or marring of heads, all driven to uniform tension, 3 models . . . **Also Fixtures, Nut Drivers, Hopper Units and Special Assembly Machines.** Modern necessities that will materially cut production costs.

MOTORIZED HOPPER UNITS

Sturdy efficient machines, easily adapted to Presses, Centerless Grinders, Thread Rolling and Slotting Machines or Special Machines. They will feed Screws, Screw Blanks, Rivets, Pins, Discs, Nuts, Bearing Rollers, Steel Balls, Washers and miscellaneous items. 6 sizes: 8", 10", 12", 16", 24" and 30" diameters.

Mail Coupon for Catalog

DETROIT POWER SCREWDRIVER CO.
2811 West Fort St., Detroit 16, Michigan

Yes, send along your new catalog . . . sounds interesting.

COMPANY NAME _____

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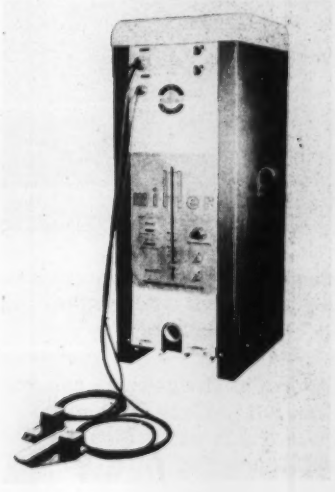
provided in both directions if desired.

There is complete control of torque and speed, making it possible to secure desired speed and clamping pressure in either or both directions. Unit may be operated by hand, foot, cam or solenoid valves. Air motor has a reciprocating rotary motion.

Check No. 8 on Reply Card for more Details

Rapid Amperage Control Welder

Developed by Miller Electric Mfg. Co., Appleton, Wis., for Heliarc welding, an alternating current arc welder has a hydraulic control which enables the operator to make instant amperage changes without leaving the work and without breaking the arc. The change can be made from



minimum to maximum or vice versa within a few seconds, or the change may be made as slowly as the application demands.

Amperage is controlled at the work by a reversible foot switch. Welders are supplied in three amperage ranges: 10 to 200, 10 to 400 and 10 to 700 amp, in either A or B models. On the A model, power and high frequency are controlled by one switch and amperage by another switch, gas and water are automatically controlled. On the B model, power, high frequency, gas and water are automatically controlled, this model having but one foot switch.

Check No. 9 on Reply Card for more Details

Grinds All with Two Fixtures

Only two fixtures are required to handle the standard range of milling cutters, such as end and side mills, spot facers, angular and dovetail cutters, etc., on the heavy-duty Ace tool and cutter grinder, made by Oliver Instrument Co. Inc., Adrian, Mich. Method used for grinding cutters is to move the horizontal ram

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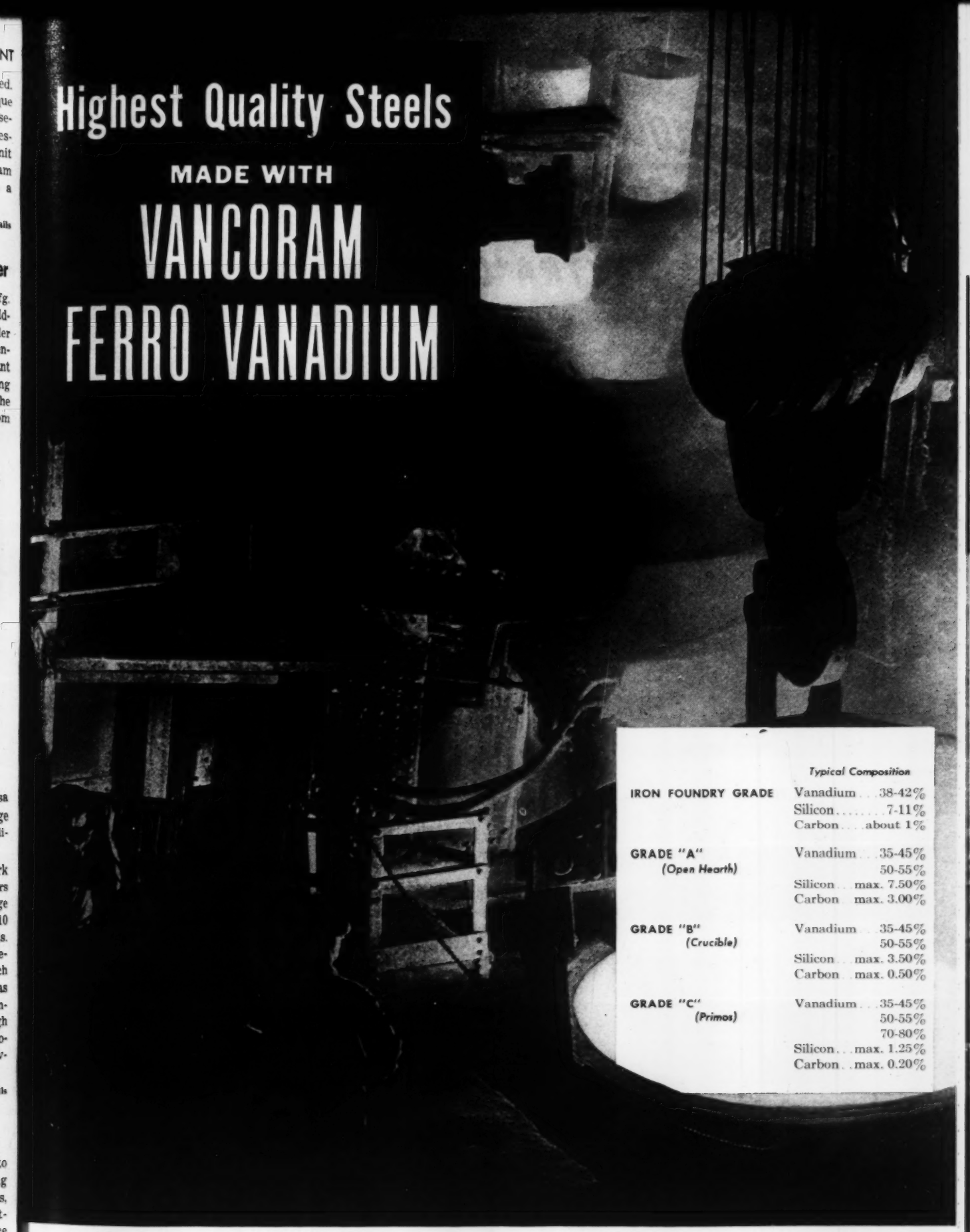

	Typical Composition	
IRON FOUNDRY GRADE	Vanadium	38-42%
	Silicon	7-11%
	Carbon	about 1%
GRADE "A" *(Open Hearth)*	Vanadium	35-45%
		50-55%
	Silicon	max. 7.50%
	Carbon	max. 3.00%
GRADE "B" *(Crucible)*	Vanadium	35-45%
		50-55%
	Silicon	max. 3.50%
	Carbon	max. 0.50%
GRADE "C" *(Primos)*	Vanadium	35-45%
		50-55%
		70-80%
	Silicon	max. 1.25%
	Carbon	max. 0.20%

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Here's what the Kaufman *Double Extrusion* Process does for Socket Head Screws. It gives them greater strength by creating beneficial changes in the steel's grain flow. Sockets are formed in one operation—perfectly concentric, true hex with sharp corners, and *clean*—all the way to the bottom. It pays you to specify and buy Cleveland Socket Head Screws.

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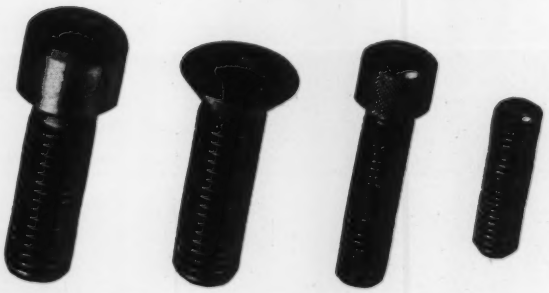
2917 EAST 79TH STREET • CLEVELAND 4, OHIO
Warehouses Chicago, Philadelphia and New York



CLEVELAND Top Quality FASTENERS

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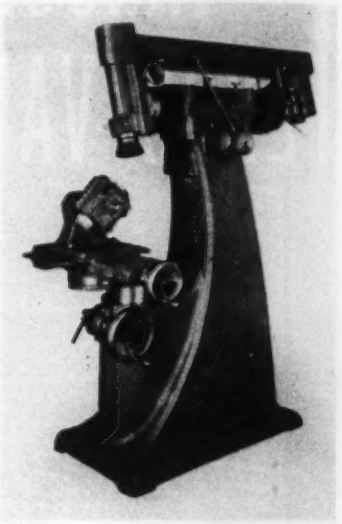
Specialists for more than 30 years in
CAP SCREWS, SET SCREWS, MILLED STUDS
Ask your jobber for Cleveland Fasteners

carrying the cutting wheel spindle across the work, this permitting speedy indexing, quick setup and grinding. To further speed the operation and simplify grinding, the horizontal ram is mounted on a series of ¾-inch balls contained in hardened and ground steel tracks.

It is possible for the operator to feel the cutting action of the wheel



and he can determine when the wheel is cutting at its maximum efficiency. Only 6 ounces of pressure on the operating hand lever is required to start the ram movement. Spindle drive is equipped with V-pulleys and belt which provide three grinding speeds.

Check No. 10 on Reply Card for more Details

Comparator Illuminating Unit

Now included on all model BC-14, PC-14 and PC-30 optical comparators, made by Jones & Lamson Machine Co., Springfield, Vt., is a high intensity illuminating unit. It provides increased screen illumination, particularly at high magnifications. Shadow outlines are made sharper and more highly accurate readings can be obtained with less effort.

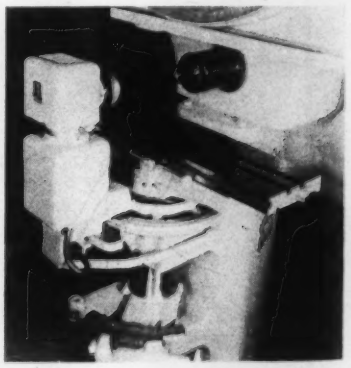


Illustration shows the unit mounted

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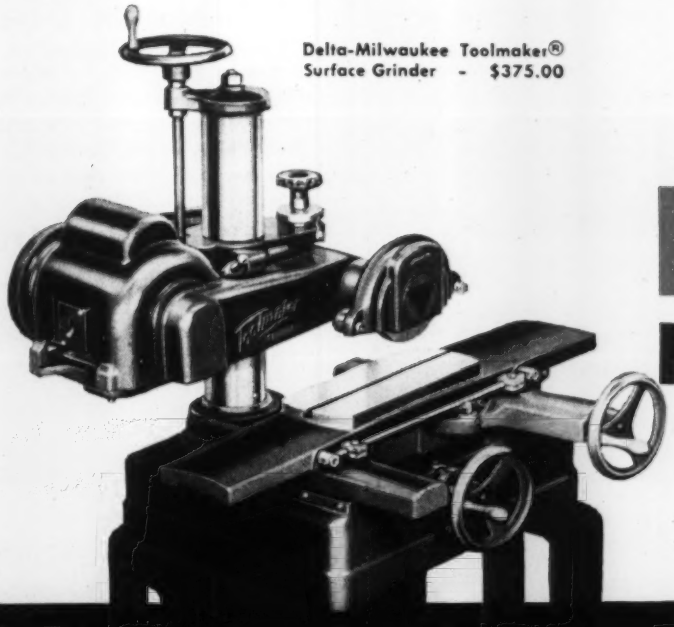

Delta-Milwaukee Toolmaker®
Surface Grinder - $375.00

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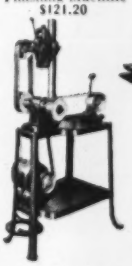
Delta

the most complete grinder line

Abrasive Belt Finishing Machine $121.20

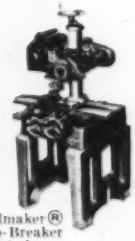
Tool Grinder with Safety Shields (bench model) $95.00

Tool Grinder with Safety Shields (floor model) $114.00



Belt Grinding, Polishing, and Deburring Machine $130.75

Carbide Tool Grinder $154.00



Toolmaker® Chip-Breaker Grinder $412.50

Toolmaker® Tool-and-Cutter Grinder - - $425.00

Motor and switch extra in some cases Prices subject to change without notice

LOOKING for a machine to cut your grinding costs? Delta has the answer—bench- and floor-model grinders of many types with the exact current and speed you need to meet your requirements — surface grinders, standard tool grinders, carbide grinders, chip-breaker grinders, tool-and-cutter grinders, abrasive belt machines, etc.

You'd expect to pay much more for the all-around high quality of low-cost Delta grinders. For example, the Delta-Milwaukee standard tool grinder has illuminated safety shields built in. Wheel guards meet strict safety regulations. Ball bearings are lubricated for life. Tool rests are completely machined, fully adjustable.

Delta, you know, is the industry's most complete line of metalworking and woodworking machines. It's the only line with complete accessories to make every tool do more jobs — and often save you a larger investment in other machines.

So, for a grinder — or any other machine — look to Delta's complete, quality line first. Send coupon for catalogs and bulletins on the entire Delta line.

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3 Cut-Off Machines

3 Welders

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53 Machines — 246 Varieties

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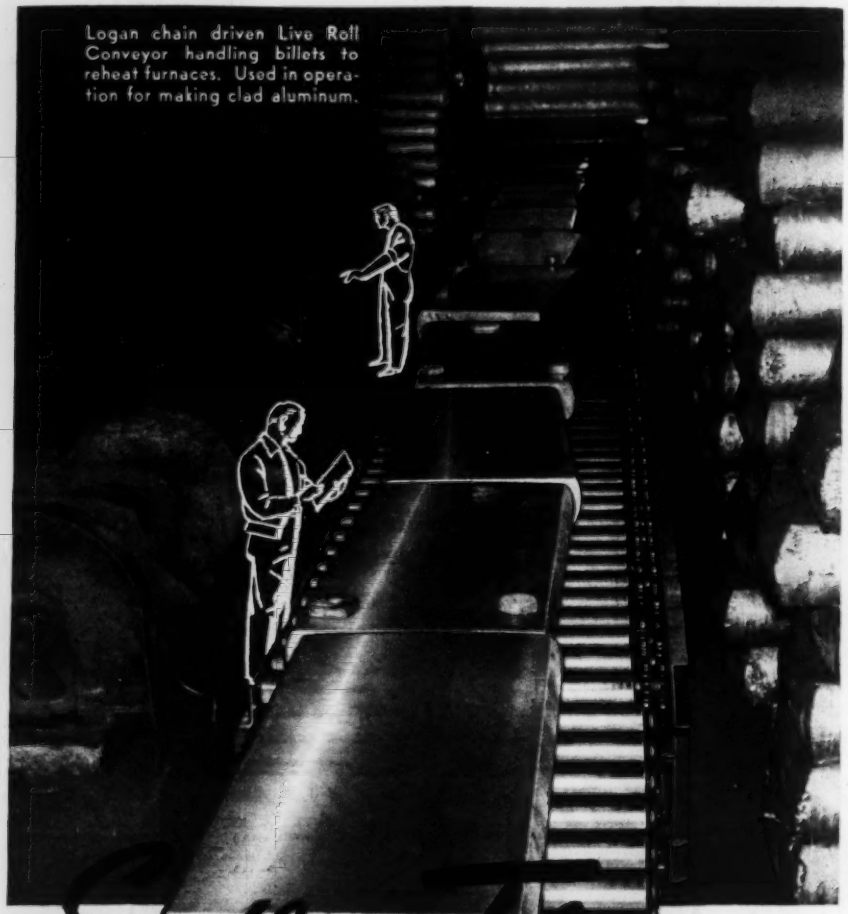


Logan chain driven Live Roll Conveyor handling billets to reheat furnaces. Used in operation for making clad aluminum.

Endless Flow

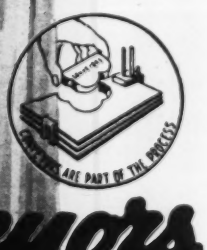
... like a mighty river

The heaviest loads flow steadily on and on in a never ending stream with apparent ease and smoothness.

Built by men who have grown up with the industry, Logan Conveyors have paced the growth of Steel output for two generations. Case histories in the nation's leading mills prove that superior engineering, strength and heft in construction, long life and trouble-free performance, give Logan Conveyors a decided advantage in cutting cost corners.

Regardless of your present handling methods, chances are we can show you ways to save money and increase efficiency.

Write today for literature or for the nearest Logan Engineer to call. No obligation.



Logan Conveyors

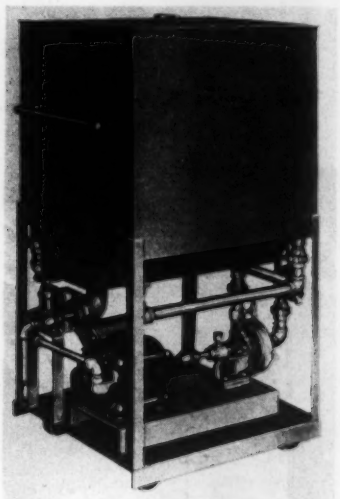
LOGAN CO., INC., 535 CABEL ST., LOUISVILLE, KY.

on model PC-30 pedestal type optical comparator. Upper portion of unit carries a 10-v bulb, condensing lens and colored filter. Lower box section houses the small centrifugal-type electrically driven blower.

Check No. 11 on Reply Card for more Details

Spray Washer for Small Parts

Industrial Filter & Pump Mfg. Co., 1621 W. Carroll Ave., Chicago 12, Ill., is producing a self-contained spray washer for small parts and intricate assemblies. Baskets of small parts may be handled as units. Washer



consists of a welded steel tank measuring 24 x 24 x 24 inches with a perforated steel false bottom for supporting the work to be cleaned. In each corner are four swivel spray nozzles that direct fine, forceful sprays on the parts. An ample supply of solvent is carried in the sump below the false bottom.

Tank is supported on a frame of angle iron and steel base which carries pumping unit for recirculating the solvent. Motor and switch are of explosion-proof type. Four 3-inch casters provide mobility. Unit is finished inside and out with a solvent-resistant paint.

Check No. 12 on Reply Card for more Details

Controls Current Pneumatically

Developed to permit use of standard industrial pneumatic controllers on applications involving electrical components as the final controlled element, is the model EB pneumatic current controller offered by Conoflow Corp., 2100 Arch St., Philadelphia 3, Pa. Assemblies may be used in control systems for the ultimate control of temperature, flow, speed, pH, etc.

Another use may be in conjunction with a small rheostat-potentiometer

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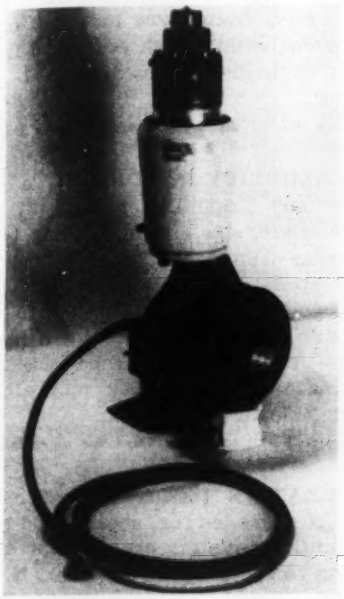
for controlling input through electronic speed control devices. Controller utilizes a standard electrical component modified for continuous throttling control service and a pneumatic cylinder operator which in-



cludes an integrally mounted positioning device to provide accuracy and sensitivity of positioning to within 1/500 part of its total travel.

Check No. 13 on Reply Card for more Details

Truck Lightens Load

With 2000 pounds capacity and 21 sq ft of loading space, the model GC 2-56 ToteMaster burden carrier, made by Lewis-Shepard Products Inc., 262 Walnut St., Watertown 72, Mass., is

powered by a 20 hp high compression engine. It is governor controlled for speeds up to 20 mph.

Specifications include electric starter, hydraulic airplane type brakes, seat-operated parking brake, T-handle steering, pneumatic tires, and two-wheel drive through automotive type differential. Truck has three speeds forward, one in reverse.

Check No. 14 on Reply Card for more Details

• • •

CHARGING EQUIPMENT: New single-circuit, rotating type battery

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• Improve Your Products
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Grip without a slip!
Easy to clean!
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Install A.W. Super-Diamond Rolled Steel Floor Plate in your plant and you eliminate floor maintenance bills and costly slipping accidents. It requires no maintenance, and the exclusive engineered Super-Diamond Pattern "grips without a slip" keeping men's feet safe and secure. A.W. Super-Diamond improves products too. On machine tool bases, saddle tanks, lift trucks and on heavy construction equipment, both stationary and mobile, it guards against slipping accidents. Architects, product engineers, safety engineers and purchasing agents everywhere specify Super-Diamond for safety.
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charging equipment for electric industrial trucks is announced by General Electric's Small and Medium Motor Divisions, Schenectady 5, N. Y. Equipment has more than 2000 available adjustments of charging characteristics and meets charging requirements of all industrial batteries. It is available in two models.

Check No. 15 on Reply Card for more Details

WIRE ROPE SLING: Drew 14-part, type 1 CT, flat-braided wire rope sling, made by Macwhyte Co., Kenosha, Wis., is designed to provide a relatively wide, flat bearing surface with the sling thickness held to a minimum. It is fabricated from one endless wire rope and the sling ends terminate in natural loops which are fitted with the company's cresent thimbles.

Check No. 16 on Reply Card for more Details

STORE FLUIDS: Low pressure, air operated accumulators that eliminate the danger of handling high pressure gases and that store fluids at up to 10,000 psi for use when required are offered by Miller Motor Co., Chicago 18, Ill.

Check No. 17 on Reply Card for more Details

FIRE RETARDANT PAINT: Called Flame-Seal, a new fire retardant and nontoxic paint, is announced by Flame-Seal Corp. of Ohio, Toledo, O. Recommended for use on all combustible wood surfaces, as well as plywood, veneer, cardboard, etc., the paint will at no time support combustion. It gives off no toxic gases while being applied or when exposed to fire.

Check No. 18 on Reply Card for more Details

SWIVEL-BASED VISE: A new vise developed by Kenco Mfg. Co., Los Angeles 22, Calif., incorporates a system of numerical graduations around the beveled edge of the base, reading from 0 to 90 degrees, then back to 0, thus allowing synchronized readings from markers on either side of vise. Vise opens to 4 inches.

Check No. 19 on Reply Card for more Details

MAGNETIC STARTER: A new magnetic starter in sizes to 5 hp, 220 v, ac, 7½ hp, 440-550 v, ac, is offered by Furnas Electric Co., Batavia, Ill. It is furnished with dual voltage coils, with or without built-in pilot controls and in general purpose or watertight enclosure.

Check No. 20 on Reply Card for more Details

MILD STEEL ELECTRODE: Lincoln Electric Co., Cleveland 1, O., introduces a new mild steel E6012 electrode, Fleetweld 72, for high speed production of single pass fillet and lap welds in flat or horizontal positions. It is available in 14 and 18-inch lengths and in the following diameter sizes: ⅛, 5/32, 3/16, 7/32, ¼, and 5/16-inch; for operation on alternating or direct current.

Check No. 21 on Reply Card for more Details

SELF-RIGHTING BUCKETS: Blaw-Knox Co., Pittsburgh, Pa., has redesigned its line of tip-over and self-righting dumping buckets. Former riveted construction has been replaced with an all-welded design. Buckets are available in standard weights for use in handling foundry sand, ashes, brickbats, etc, and in heavy weight sizes for heavy industrial uses.

Check No. 22 on Reply Card for more Details

RUBBER GLOVE: Called Griprite, a new industrial rubber glove made by B. F. Goodrich Co., Akron, O., is made with a roughened surface which is an integral part of the glove, and assures a firm, tight grip even in the wettest application. It has curved fingers, is 14 inches long and made in sizes 9, 10, and 11.

Check No. 23 on Reply Card for more Details

DRILL BUSHINGS: A complete line of solid carbide drill bushings for drill sizes 0.0280 to 1.7500 inches is announced by S & E Machine Products Inc., Bridgeport, Mich. They are interchangeable with standard steel bushings and are available in four types: Headless press fit, head press fit, fixed renewable and slip renewable.

Check No. 24 on Reply Card for more Details

PORTABLE COMPRESSOR: An improved all-purpose, portable air compressor, introduced by Paramount Compressor Corp., Chicago, Ill., delivers air pressure at 2¼ cfm at 25 to 20 pounds pressure, sustained pressures up to 50 pounds and intermittent pressures up to 80 pounds. Compressors are used with spray guns for painting.

Check No. 25 on Reply Card for more Details

RUST INHIBITING PAINT: Known as certified rust inhibitor No. 425, a new rust inhibiting oil base paint is offered by United Laboratories Inc., Cleveland 12, O. It may be applied to damp or dry surfaces and will serve as both a rust preventive and finish coat in one application. Paint withstands dry heat up to 500° F and is available in several colors.

Check No. 26 on Reply Card for more Details

EXPANDING ARBOR: Designated as type B, a new range of sizes for the Auto-Arb, is announced by Asco Corp., Cleveland 19, O. It is a production tool of the expanding arbor type designed for holding workpieces by the inside diameter while machining, counterboring, chamfering or finishing outside surface. Type B will accommodate work with inside diameters from 33/64 to 1-inch on a machine with ½-inch collet and from 1 1/64 to 1½-inches with a 1-inch collet.

Check No. 27 on Reply Card for more Details

FLEXIBILITY IN TUBING: To convert any Triple-Lok fitting (37 degree flare, steel) to a reducing type, Parker Appliance Co., Cleveland 12, O., offers a new tube end reducer. Attached with standard nut to the fitting tube end, it provides a flared nose for a smaller tube size and threads for a smaller nut. It is available in eight sizes.

Check No. 28 on Reply Card for more Details

VIBRATION ISOLATORS: For use in compression or shear, stud-type vibration isolators are announced by Finn & Co., New York 30, N. Y. Each mount features a "floating rubber" principle. A rubber cylinder is rigidly bonded to steel end plates to which studs are welded. One stud can be bolted to a foundation, the other to a piece of equipment.

Check No. 29 on Reply Card for more Details

SHOP DESK: Berger Mfg. Division, Republic Steel Corp., Canton, O., offers No. 1210 desk which is constructed to afford comfortable writing while in a standing position. It is 33 inches wide, 43 inches high in front and 52¼ inches high in back including a 7-inch high hood across the back. Shelves for orders and records are located beneath the protective hood.

Check No. 30 on Reply Card for more Details

SILVER JOINING ALLOY: With a remelt temperature of 1850° F, a new silver joining alloy designated as EutecRod 1807, is announced by Eutectic Welding Alloys Corp., New York 13, N. Y. It has a hardness of 64-70 Brinell, tensile strength is 30,000 to 32,000 psi. It is available in 1/64, 1/32 and 1/16-inch coils.

Check No. 31 on Reply Card for more Details

FOR MORE INFORMATION
on the new products and equipment in this section, fill in a card. It will receive prompt attention.

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Market Summary

TIGHT supply conditions threaten in the major steel products over remainder of the year. Steelmakers are fighting a losing battle in their struggle to keep pace with demand. Despite record-breaking output, order backlogs continue to swell under consumer pressure reminiscent of the frantic buying in the scarcity market two years ago. And vacation curtailments next month promise further tightening in supply conditions. The mills already hold commitments extending into fourth quarter on light, flat-rolled products and carbon bars. Plate and shape deliveries are lengthening. Specialties, such as stainless and electrical sheets, are sold out for weeks ahead. Orders for line pipe extend into 1954. Jobbers' stocks of standard pipe are unbalanced and inadequate to meet steadily rising demand.

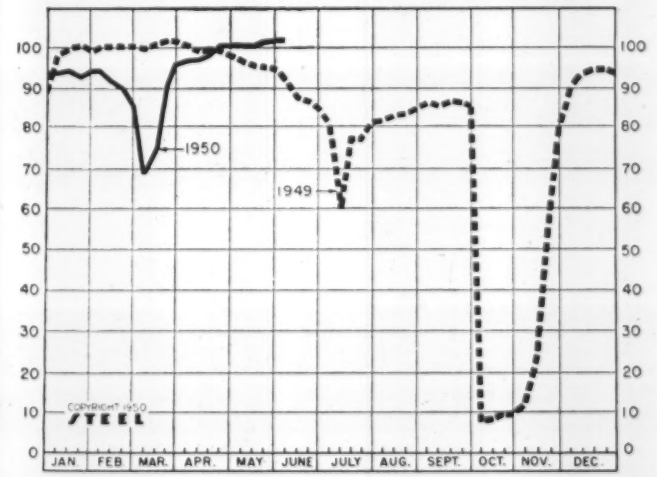
SUPPLY—With carryover tonnage into third quarter promising to take most of that period's production, consumers are turning increasingly to the premium markets for relief. Conversion business is rising and some converters now are reported booked into late fourth quarter. Imported iron and steel products are meeting broader acceptance, especially products priced under the domestic market. Gray market offerings are appearing with growing frequency but activity in this area still is restricted. In some cases manufacturing operations are being hampered by lack of steel supply and warehouses are being called upon more and more for stopgap tonnage.

SCRAP—One of the most important bullish factors influencing steel market developments currently is the sharp advance in scrap prices. Although mill buying is limited a rush for tonnage is on among brokers seeking to cover commitments in competition with conversion market purchasers. And some brokers are getting hurt in the scramble, being forced to pay more for tonnage than their commitments to the mills call for. Steelmakers again are taking in earmarked tonnage from consumers on direct deals. Also, scrap is being brought in to mill centers from distant points. The net result gives this market the same hectic appearance as that during the immediate postwar period. Some foreign scrap is being imported as the mills seek to hold the price runaway in check. Current average of steelmaking scrap prices is about 35 per cent over that pervailing last December when finished steel prices were generally raised. STEEL's composite on steelmaking grades now stands at $37.17, up $1.67 since a week ago, and $9.14 above December.

PRICES—Isolated price advances on finished steel products continue to be made. Also, consumers are paying considerably above published prices in the conversion and premium markets—premiums up to $20 per ton on cold-rolled sheets are openly quoted. However, despite sharply increased production and raw material costs, especially scrap, the view prevails that no general price increase by the large integrated steelmakers is in the cards. Capacity production and high earnings argue against such at this time, it is said, though specific product increases to compensate for unusual costs are not crossed out. For example, an increase on stainless and nickel alloy steels as result of last week's increase of 8 cents per lb on nickel would not be surprising. Last week, Central Iron & Steel Co. raised carbon plates $7 per ton and Rotary Electric Steel Co. forging billets $3.

COMPOSITES—Despite continued isolated price advances STEEL's weighted index of finished steel prices (based on Pittsburgh quotations) holds unchanged at 156.13. The arithmetical composite on finished steel, however, is up slightly to $94.32 from $94.23 the week preceding. Pig iron composites are unchanged with No. 2 foundry, $46.47, basic, $45.97, and malleable $47.27.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

Percentage of Capacity Engaged at Leading Production Points

	Week Ended June 3	Change	Same Week 1949	Same Week 1948
Pittsburgh	101.5	— 1.5*	88	95
Chicago	104	— 0.5*	99	96
Eastern Pa.	98	0	86.5	89
Youngstown	106	— 1	103	103
Wheeling	108	0	85	89
Cleveland	97	— 2.5*	100	94.5
Buffalo	104	0	101.5	93
Birmingham	100	0	100	100
New England	85	0	58	78
Cincinnati	104	— 2	90	100
St. Louis	84.5	— 6.5	73.5	89.5
Detroit	104	+ 1	85	100
Western	95	+ 0.5	84.5	..
Estimated national rate	101.5	0	92	95.5

Based on weekly steelmaking capacity of 1,906,267 net tons for 1950; 1,843,516 net tons for 1949; 1,802,476 net tons for 1948.
* Change from revised rate.

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Composite Market Averages

	June 1 1950	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
FINISHED STEEL INDEX, Weighted:					
Index (1935-39 av.=100)	156.13	156.13	156.13	152.90	101.10
Index in cents per lb.	4.230	4.230	4.230	4.142	2.739
ARITHMETICAL PRICE COMPOSITES:					
Finished Steel, NT	$94.32	$94.32	$93.23	$92.77	$58.27
No. 2 Fdry. Pig Iron, GT	46.47	46.47	46.47	46.07	24.67
Basic Pig Iron, GT	45.97	45.97	45.97	45.60	24.00
Malleable Pig Iron, GT	47.27	47.27	47.27	47.27	25.29
Steelmaking Scrap, GT	37.17	35.50	30.92	21.83	19.00

Weighted finished steel index based on average shipments and prices of the following 14 representative products during 5-year base period 1935-39: Structural shapes, plates, rails, hot-rolled and cold-finished bars, pipe, wire, nails, tin plate, hot and cold-rolled sheets, galvanized sheets, hot and cold-rolled strip. For complete explanation see STEEL, Sept. 19, 1949, p. 54.

Arithmetical steel price composite based on same products as the weighted finished steel index with the exception of rails, cold-finished bars, galvanized sheets and hot-rolled strip.

Basic and No. 2 foundry pig iron composites are based on average prices at Pittsburgh, Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Granite City, Youngstown. Malleable composite based on same points, except Birmingham.

Steelmaking scrap composite based on average prices of No. 1 heavy melting steel at Pittsburgh, Chicago and Philadelphia.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED MATERIALS

	June 1 1950	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh	3.45	3.45	3.45	3.35	2.25
Bars, H.R., Chicago	3.45	3.45	3.45	3.35	2.25
Bars, C.F., Pittsburgh	4.10–15	4.10–15	4.10–15	3.95-4.00	2.65
Shapes, Std., Pittsburgh	3.40	3.40	3.40	3.25	2.10
Shapes, Std., Chicago	3.40	3.40	3.40	3.25	2.10
Plates, Pittsburgh	3.50	3.50	3.50	3.40	2.25
Plates, Chicago	3.50	3.50	3.50	3.40	2.25
Plates, Coatesville, Pa.	3.60	3.60	3.60	3.50	2.25
Plates, Sparrows Point, Md.	3.50	3.50	3.50	3.45	2.25
Plates, Claymont, Del.	3.60	3.60	3.60	3.50	2.25
Sheets, H.R., Pittsburgh	3.35	3.35	3.35	3.25	2.20
Sheets, H.R., Chicago	3.35	3.35	3.35	3.25	2.20
Sheets, C.R., Pittsburgh	4.10	4.10	4.10	4.00	3.05
Sheets, C.R., Chicago	4.10	4.10	4.10	4.00	3.05
Sheets, C.R., Detroit	4.30	4.30	4.30	4.20	3.15
Sheets, Galv., Pittsburgh	4.40	4.40	4.40	4.40	3.70
Strip, H.R., Pittsburgh	3.25	3.25	3.25	3.25	2.10
Strip, H.R., Chicago	3.25	3.25	3.25	3.25	2.10
Strip, C.R., Pittsburgh	4.15	4.15	4.15	4.00–75	2.80
Strip, C.R., Chicago	4.30	4.30	4.30	4.00–15	2.90
Strip, C.R., Detroit	4.35–40	4.35–40	4.35–40	4.20–45	2.90
Wire, Basic, Pittsburgh	4.50	4.50	4.50	4.15	2.75
Nails, Wire, Pittsburgh	5.30	5.30	5.30	5.15	2.90
Tin plate, box, Pittsburgh	$7.50	$7.50	$7.50	$7.75	$5.00

SEMIFINISHED

Billets, forging, Pitts. (NT)	$63.00	$63.00	$63.00	$61.00	$42.00
Sheet bar, mill (NT)	58.00	58.00	57.00–58.00	67.00	36.00
Wire rods, 7/32-⅝", Pitts.	3.85	3.85	3.85	3.775	2.15

PIG IRON, Gross Ton

Bessemer, Pitts.	$47.00	$47.00	$47.00	$47.00	$25.50
Basic, Valley	46.00	46.00	46.00	46.00	24.50
Basic, del. Phila.	49.44	49.44	49.44	49.39	26.34
No. 2 Fdry, Pitts.	46.50	46.50	46.50	46.50	25.00
No. 2 Fdry, Chicago	46.50	46.50	46.50	46.25	25.00
No. 2 Fdry, Valley	46.50	46.50	46.50	46.50	25.00
No. 2 Fdry, del. Phila.	49.94	49.94	49.94	49.89	26.84
No. 2 Fdry, Birm.	42.38	42.38	42.38	39.38	21.38
No. 2 Fdry. (Birm.)del.Cin.	49.08	49.08	49.08	45.43	25.06
Malleable, Valley	46.50	46.50	46.50	46.50	25.00
Malleable, Chicago	46.50	46.50	46.50	46.50	25.00
Charcoal, Lyles, Tenn.	60.00	60.00	60.00	66.00	33.00
Ferromanganese, Etna, Pa.	175.00	175.00	175.00	175.00	140.33*

* Delivered, Pittsburgh.

SCRAP, Gross Ton

No. 1 Heavy Melt, Pitts.	$42.50	$39.00	$35.00	$23.00	$20.00
No. 1 Heavy Melt, E. Pa.	32.50	32.50	27.25	21.00	18.25
No. 1 Heavy Melt, Chicago	36.50	35.00	30.50	21.50	18.75
No. 1 Heavy Melt, Valley	44.75	38.75	34.75	22.00	20.00
No. 1 Heavy Melt, Cleve.	42.75	35.25	31.25	18.50	19.50
No. 1 Heavy Melt, Buffalo	36.75	34.50	29.75	21.75	19.25
Rails, Rerolling, Chicago	52.50	49.50	47.50	27.75	22.25
No. 1 Cast, Chicago	48.50	46.50	42.50	27.50	20.00

COKE, Net Ton

Beehive, Furn., Connlsvl.	$14.25	$14.25	$14.25	$14.25	$7.50
Beehive, Fdry., Connlsvl.	15.50	15.50	16.00	16.25	8.25
Oven Fdry., Chicago	21.00	21.00	21.00	20.40	13.35

NONFERROUS METALS

Copper, del. Conn.	20.50	20.50	19.50	17.625	12.00
Zinc, E. St. Louis	13.00	12.50	11.50	11.00	8.25
Lead, St. Louis	11.80	11.80	11.05	11.85	6.35
Tin, New York	78.00	78.25	77.00	103.00	52.00
Aluminum, del.	17.50	17.50	17.00	17.00	15.00
Antimony, Laredo, Tex.	24.50	24.50	24.50	38.50	14.50
Nickel, refinery, duty paid	48.00	40.00	40.00	40.00	35.00

Pig Iron

For key to producing companies, turn next page.
Minimum delivered prices do not include 3% federal tax.

PIG IRON, Gross Ton

	Basic	No. 2 Foundry	Malleable	Bessemer
Bethlehem, Pa. B2	$48.00	$48.50	$49.00	$49.50
Newark, del.	50.63	51.13	51.63	52.13
Brooklyn, N.Y., del.	....	52.79	53.29	....
Birmingham District				
Birmingham R2	41.88	42.38	....	....
Birmingham S9	41.88	42.38	....	....
Woodward, Ala. W15	41.88	42.38	....	....
Cincinnati, del.	....	49.08	....	....
Buffalo District				
Buffalo H1, R2	46.00	46.50	47.00	....
Tonawanda, N.Y., W12	46.00	46.50	47.00	....
N. Tonawanda, N.Y., T9	....	46.50	47.00	....
Boston, del.	55.26	55.76	56.20	....
Rochester, N.Y., del.	48.63	49.13	49.63	....
Syracuse, N.Y., del.	49.58	50.08	50.58	....
Chicago District				
Chicago I-3	46.00	46.50	46.50	47.00
Gary, Ind. C3	46.00	....	46.50	....
Indiana Harbor, Ind. I-2	46.00	....	46.50	....
So. Chicago, Ill. W14, Y1	46.00	46.50	46.50	....
So. Chicago, Ill. C3	46.00	....	46.50	47.00
Milwaukee, del.	47.89	48.39	48.39	48.89
Muskegon, Mich., del.	....	51.98	51.98	....
Cleveland District				
Cleveland A7	46.00	46.50	46.50	47.00
Cleveland R2	46.00	46.50	46.50	....
Akron, del. from Cleve.	48.39	48.89	48.89	49.39
Lorain, O. N3	46.00	....	....	47.00
Duluth I-3	....	....	46.50	....
Erie, Pa. I-3	46.00	46.50	46.50	47.00
Everett, Mass. E1	....	50.50	51.00	....
Fontana, Calif. K1	52.00	52.50	....	....
Geneva, Utah G1	46.00	46.50	....	....
Seattle, Tacoma, Wash., del.	....	54.20	....	....
Portland, Oreg., del.	....	54.20	....	....
Los Angeles, San Francisco, del.	53.70	54.20	....	....
Granite City, Ill. M10	47.90	48.40	48.90	....
St. Louis, del. (incl. tax)	48.65	49.15	49.65	....
Ironton, Utah C11	46.00	46.50	....	....
Minnequa, Colo. C10	47.00	47.50	47.50	....
Pittsburgh District				
Neville Island, Pa. P6	46.00	46.50	46.50	47.00
Pitts. N.&S. sides, Ambridge, Aliquippa, del.	47.19	47.69	47.69	48.19
McKees Rocks, del.	46.95	47.45	47.45	47.95
Lawrenceville, Homestead, McKeesport, Monaca, del.	47.44	47.94	47.94	48.44
Verona, del.	47.90	48.40	48.40	48.90
Brackenridge, del.	48.13	48.63	48.63	49.13
Bessemer, Pa. C3	46.00	....	46.50	47.00
Clairton, Rankin, So. Duquesne, Pa. C3	46.00	....	....	....
McKeesport, Pa. N3	46.00	....	....	47.00
Sharpsville, Pa. S6	46.00	46.50	46.50	47.00
Steelton, Pa. B2	48.00	48.50	49.00	49.50
Steubenville, O. W10	46.00	....	....	....
Struthers, O. S16	46.00	....	....	....
Swedeland, Pa. A3	48.00	48.50	49.00	49.50
Philadelphia, del.	49.44	49.94	50.44	50.94
Toledo, O. I-3	46.00	46.50	46.50	47.00
Cincinnati, del.	51.01	51.51	....	....
Troy, N.Y., R2	48.00	48.50	49.00	49.50
Youngstown District				
Hubbard, O. Y1	46.00	46.50	46.50	....
Youngstown C3	46.00	....	....	47.00
Youngstown Y1	46.00	46.50	46.50	47.00
Mansfield, O., del.	50.26	50.76	50.76	51.26

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si over base grade, 1.75-2.25%.

Phosphorous: Deduct 38 cents per ton for P content of 0.70% and over.

Manganese: Add 50 cents per ton for each 0.50% manganese over 1% or portion thereof.

Nickel: Under 0.50% no extra; 0.50-0.74%, incl., add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1 for each 0.5% Si to 11.50%)

Jackson, O. G2, J1	$57.00
Buffalo H1	58.25

ELECTRIC FURNACE SILVERY PIG IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1 for each 0.5% Mn over 1%; $1 for 0.045% max. P)

Niagara Falls, N.Y. P15	$71.50
Keokuk, Iowa, Openhearth & Fdry, frt. allowed K2	77.00
Keokuk, Iowa, OH & Fdry., 12½ lb. piglets, frt. allowed K2	82.00
Wenatchee, Wash., OH & Fdry, frt. allowed K2	77.00

CHARCOAL PIG IRON, Gross Ton

(Low phos. semi-cold blast; differential charged from silicon over base grade; also for hard chilling iron Nos. 5 & 6)

Lyles, Tenn. T3	$60.00

LOW PHOSPHOROUS PIG IRON, Gross Ton

Cleveland, intermediate, A7	$51.00
Steelton, Pa. B2	54.00
Philadelphia delivered	57.00
Troy, N.Y. R2	54.00

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Semifinished and Finished Steel Products

Mill prices as reported to STEEL, June 1, 1950; cents per pound except as otherwise noted. Changes shown in italics.
Code numbers following mill points indicate producing company; key on next two pages.

INGOTS, Carbon, Forging (NT)
Detroit R7 ..... $50.00
Munhall,Pa. C3 ..... 50.00

INGOTS, Alloy (NT)
Detroit R7 ..... $51.00
Houston,Tex. S5 ..... 59.00
Midland,Pa. C18 ..... 51.00
Munhall,Pa. C3 ..... 51.00
So.Duquesne,Pa. C3 ... 51.00

BILLETS, BLOOMS & Slabs

Carbon, Rerolling (NT)
Bessemer,Pa. C3 ..... $53.00
Clairton,Pa. C3 ..... 53.00
Conshohocken,Pa. A3 .. 58.00
Ensley,Ala. T2 ..... 53.00
Fairfield,Ala. T2 ..... 53.00
Fontana,Cal. K1 ..... 72.00
Gary,Ind. C3 ..... 53.00
Johnstown,Pa. B2 ..... 53.00
Lackawanna,N.Y. B2.. 53.00
Munhall, Pa. C3 ..... 53.00
Sharon,Pa. S3 ..... 57.00
So.Chicago,Ill. C3 .... 53.00
So.Duquesne,Pa. C3 ... 53.00

Carbon, Forging (NT)
Bessemer,Pa. C3 ..... $63.00
Buffalo R2 ..... 63.00
Canton,O. R2 ..... 63.00
Clairton,Pa. C3 ..... 63.00
Cleveland R2 ..... 63.00
Conshohocken,Pa. A3 .. 65.00
Detroit R7 ..... 66.00
Ensley,Ala. T2 ..... 63.00
Fairfield,Ala. T2 ..... 63.00
Fontana,Calif. K1 ..... 82.00
Gary,Ind. C3 ..... 63.00
Geneva,Utah G1 ..... 63.00
Houston,Tex. S5 ..... 71.00
Ind.Harbor,Ind. I-2 .... 63.00
Johnstown,Pa. B2 ..... 63.00
Lackawanna,N.Y. B2.. 63.00
Los Angeles B3 ..... 82.00
Munha.l,Pa. C3 ..... 63.00
Seattle B3 ..... 82.00
So.Chicago C3,R2,W14 .63.00
So.Duquesne,Pa. C3 .. 63.00
So.SanFrancisco B3 .... 82.00
Warren,O. C17 ..... 63.00

Alloy (NT)
Bethlehem,Pa. B2 .... $66.00
Buffalo R2 ..... 66.00
Canton,O. R2, T7 .... 66.00
Conshohocken,Pa. A3.. 68.00
Detroit R7 ..... 66.00
Fontana,Calif. K1 .... 85.00
Gary,Ind. C3 ..... 66.00
Houston,Tex. S5 ..... 74.00
Ind.Harbor,Ind. Y1 ... 66.00
Johnstown,Pa. B2 .... 66.00
Lackawanna,N.Y. B2 .. 66.00
LosAngeles B3 ..... 86.00
Massillon,O. R2 ..... 66.00
Midland,Pa. C18 ..... 66.00
Munhall,Pa. C3 ..... 66.00
Sharon,Pa. S3 ..... 66.00
So.Chicago C3,R2,W14 .66.00
So.Duquesne,Pa. C3 .. 66.00
Warren,O. C17 ..... 66.00
Youngstown Y1 ..... 66.00

SHEETS BARS (NT)
Mansfield,O. E6 ..... $58.00

ROUNDS, SEAMLESS TUBE (NT)
Canton,O. R2 ..... $76.00
Cleveland R2 ..... 76.00
Gary,Ind. C3 ..... 76.00
Ind.Harbor,Ind. I-2 ... 76.00
Massillon,O. R2 ..... 76.00
So.Chicago,Ill. R2 .... 76.00
So.Duquesne,Pa. C3 ... 76.00

SKELP
Aliquippa,Pa. J5 ..... 3.25
Munhall,Pa. C3 ..... 3.15
Warren,O. R2 ..... 3.15
Youngstown C3, R2 .... 3.15

WIRE RODS
AlabamaCity,Ala. R2 .. 3.85
Buffalo W12 ..... 3.85
Cleveland A7 ..... 3.85
Donora,Pa. A7 ..... 3.85
Fairfield,Ala. T2 ..... 3.85
Houston,Tex. S5 ..... 4.25
Ind.Harbor,Ind. Y1 .... 3.85
Johnstown,Pa. B2 ..... 3.85
Joliet,Ill. A7 ..... 3.85
LosAngeles B3 ..... 4.65
Minnequa,Colo. C10 .... 4.10
Monessen,Pa. P7 ..... 3.85
No.Tonawanda,N.Y. B11.4.10
Pittsburg,Calif. C11 .... 4.50
Portsmouth,O. P12 .... 3.85
Roebling,N.J. R5 ..... 3.95
So.Chicago,Ill. R2 ..... 3.85
SparrowsPoint B2 ..... 3.95
Sterling,Ill.(1) N15 .... 3.85
Struthers,O. Y1 ..... 3.85
Torrance,Calif. C11 .... 4.65

STRUCTURALS

Carbon Steel Stand. Shapes
Aliquippa,Pa. J5 ..... 3.40
Bessemer,Ala. T2 ..... 3.40
Bethlehem,Pa. B2 ..... 3.45
Clairton,Pa. C3 ..... 3.40
Fairfield,Ala. T2 ..... 3.40
Fontana,Calif. K1 ..... 4.00
Gary,Ind. C3 ..... 3.40
Geneva,Utah G1 ..... 3.40
Houston, Tex. S5 ..... 3.80
Ind.Harbor,Ind. I-2 .... 3.40
Johnstown,Pa. B2 ..... 3.45
KansasCity,Mo. S5 .... 4.00
Lackawanna,N.Y. B2 .. 3.45
LosAngeles B3 ..... 4.00
Minnequa,Colo. C10 .... 3.75
Munhall,Pa. C3 ..... 3.40
Niles,Calif.(22) P1 .... 4.02
Phoenixville,Pa. P4 .... 3.30
Portland,Oreg. O4 .... 3.90
Seattle B3 ..... 4.05
So.Chicago,Ill. C3 W14.3.40
So.SanFrancisco B3 .... 3.95
Torrance,Calif. C11 .... 4.00
Weirton,W.Va. W6 ..... 3.40

Alloy Stand. Shapes
Clairton,Pa. C3 ..... 4.05
Fontana,Calif. K1 ..... 5.25
Munhall,Pa. C3 ..... 4.05
So.Chicago,Ill. C3 ..... 4.05

H.S. Low-Alloy Stand. Shapes
Aliquippa,Pa. J5 ..... 5.15
Bessemer,Ala. T2 ..... 5.15
Bethlehem,Pa.(14) B2 .. 5.20
C.airton,Pa. C3 ..... 5.15
Fairfield,Ala. T2 ..... 5.15
Fontana,Calif. K1 ..... 5.75
Gary,Ind. C3 ..... 5.15
Ind.Harbor,Ind. I-2, Y1.5.15
Johnstown,Pa. B2 ..... 5.20
Lackawanna,N.Y.(14)B2 5.20
Munhall,Pa. C3 ..... 5.15
So.Chicago,Ill. C3 ..... 5.15
Struthers,O. Y1 ..... 5.15

Wide Flange
Bethlehem,Pa. B2 ..... 3.45
Lackawanna,N.Y. B2 .. 3.45
Munhall,Pa. C3 ..... 3.40
So.Chicago,Ill. C3 ..... 3.40

H.S., L.A Wide Flange
Munhall,Pa. C3 ..... 5.10
So.Chicago,Ill. C3 ..... 5.10

SHEET STEEL PILING
Ind.Harbor,Ind. I-2 .... 4.20
Lackawanna,N.Y. B2 .. 4.20
Munha.l,Pa. C3 ..... 4.20
So.Chicago,Ill. C3 ..... 4.20
Weirton,W.Va. W6 .... 4.20

BEARING PILES
Munhall,Pa. C3 ..... 3.40
So.Chicago,Ill. C3 ..... 3.40

PLATES, Carbon Steel
AlabamaCity,Ala. R2 .. 3.50
Aliquippa,Pa. J5 ..... 3.50
Ashland,Ky.(15) A10 .. 3.50
Bessemer,Ala. T2 ..... 3.50
Clairton,Pa. C3 ..... 3.50
Claymont,Del. W16 .... 3.60
Cleveland J5, R2 ..... 3.50
Coatesville,Pa. L7 .... 3.60
Conshohocken,Pa. A3 .. 3.60
Ecorse,Mich. G5 ..... 3.75
Fairfield,Ala. T2 ..... 3.50
Fontana,Calif. K1 ..... 4.10
Gary,Ind. C3 ..... 3.50
Geneva,Utah G1 ..... 3.50
Harrisburg,Pa. C5 ..... 3.85
Houston,Tex. S5 ..... 3.90
Ind.Harbor,Ind. I-2,Y1.3.50
Johnstown,Pa. B2 ..... 3.50
Lackawanna,N.Y. B2 .. 3.50
Minnequa,Colo. C10 .... 4.30
Munhall,Pa. C3 ..... 3.50
Pittsburgh J5 ..... 3.50
Seattle B3 ..... 4.40
Sharon,Pa. S3 ..... 3.50
So.Chicago,Ill. C3, W14.3.50
SparrowsPoint,Md. B2.. 3.50
Steubenville,O. W10 .... 3.50
Warren,O. R2 ..... 3.50
Weirton,W.Va. W6 .... 3.50
Youngstown C3, R2 Y1.3.50

PLATES (Universal Mill)
Fontana,Calf. K1 ..... 4.40

PLATES, Carbon A.R.
Fontana,Calif. K1 .... 5.25

PLATES, Open-Hearth Alloy
Coatesville,Pa. L7 ..... 4.50
Conshohocken,Pa. A3 .. 4.40
Fontana,Calif. K1 ..... 5.40
Gary,Ind. C3 ..... 4.40
Johnstown,Pa. B2 ..... 4.40
Munhall,Pa. C3 ..... 4.40
Sharon,Pa. S3 ..... 4.40
So.Chicago,Ill. C3 ..... 4.40
SparrowsPoint,Md. B2 .. 4.40

PLATES,High-Strength Low-Alloy
Aliquippa,Pa. J5 ..... 5.35
Bessemer,Ala. T2 ..... 5.35
Clairton,Pa. C3 ..... 5.35
Cleveland J5, R2 ..... 5.35
Conshohocken,Pa. A3 .. 5.35
Ecorse,Mich. G5 ..... 5.60
Fairfield,Ala. T2 ..... 5.35
Fontana,Calif. K1 ..... 5.95
Gary,Ind. C3 ..... 5.35
Geneva,Utah G1 ..... 5.35
Houston,Tex. S5 ..... 5.60
Ind.Harbor,Ind. I-2, Y1.5.35
Johnstown,Pa. B2 ..... 5.35
Munhall,Pa. C3 ..... 5.35
Pittsburgh J5 ..... 5.35
Sharon,Pa. S3 ..... 5.35
So.Chicago,Ill. C3 ..... 5.35
SparrowsPoint,Md. B2.. 5.35
Warren,O. R2 ..... 5.35
Youngstown Y1 ..... 5.35

FLOOR PLATES
Cleveland J5 ..... 4.55
Conshohocken,Pa. A3 .. 4.55
Harrisburg,Pa. C5 ..... 4.55
Ind.Harbor,Ind. I-2 .... 4.55
Munhall,Pa. C3 ..... 4.55
So.Chicago,Ill. C3 ..... 4.55

PLATES, Ingot Iron
Ashland,c.l.(15) A10 ... 3.75
Ashland,lcl(15) A10 .... 4.25
Cleveland,cl R2 ..... 4.10
Warren,O.cl R2 ..... 4.10

PLATES, Wrought Iron
Economy,Pa. B14 ..... 7.85

BARS, Hot-Rolled Carbon
AlabamaCity,Ala. R2 .. 3.45
Aliquippa,Pa. J5 ..... 3.45
Alton,Ill.(1) L1 ..... 3.45
Ashland,Ky.(17) A10 .. 3.45
Atlanta,Ga A11 ..... 3.60
Bessemer,Ala T2 ..... 3.45
Buffalo R2 ..... 3.45
Canton,O. R2 ..... 3.45
Clairton,Pa. C3 ..... 3.45
Cleveland R2 ..... 3.45
Ecorse,Mich. G5 ..... 3.55
Emeryville,Calif. J7 .... 4.20
Fairfield,Ala. T2 ..... 3.45
Fontana,Calif. K1 ..... 4.10
Gary,Ind. C3 ..... 3.45
Houston,Tex. S5 ..... 3.85
Ind.Harbor,Ind. I-2, Y1.3.45
Johnstown,Pa. B2 ..... 3.45
KansasCity,Mo. S5 .... 4.05
Lackawanna,N.Y. B2 .. 3.45
LosAngeles B3 ..... 4.15
Midland,Pa. C18 ..... 3.45
Milton,Pa. B6 ..... 3.45
Minnequa,Colo. C10 .... 3.85
Niles,Calif. P1 ..... 4.17
N.Tonawanda,N.Y. B11.3.45
Pittsburg,Calif. C11 .... 4.15
Pittsburgh J5 ..... 3.45
Portland,Oreg. O4 ..... 4.20
Seattle B3, N14 ..... 4.20
So.Chicago C3, R2, W14.3.45
So.Duquesne,Pa. C3 .... 3.45
S.SanFran.,Cal. B3 .... 4.20
Struthers,O. Y1 ..... 3.45
Torrance,Calif. C11 .... 4.15
Weirton,W.Va. W6 .... 3.45
Youngstown C3, R2 .... 3.45

BAR SIZE ANGLES; S. SHAPES
Aliquippa,Pa. J5 ..... 3.45
Atlanta A11 ..... 3.60
Johnstown,Pa. B2 ..... 3.45
Lackawanna,N.Y. B2 .. 3.45
Niles,Calif. P1 ..... 4.17
Pittsburgh(23) J5 ..... 3.45
Portland,Oreg. O4 ..... 4.20
SanFrancisco S7 ..... 4.00
Weirton,W.Va. W6 .... 3.45

BAR SIZE ANGLES; H.R.CARBON
Bethlehem,Pa. B2 ..... 3.65

BARS, Hot-Rolled Alloy
Bethlehem,Pa. B2 ..... 3.95
Buffalo R2 ..... 3.95
Canton,O. R2, T7 ..... 3.95
Clairton,Pa. C3 ..... 3.95
Ecorse,Mich. G5 ..... 4.25
Fontana,Calif. K1 ..... 4.95
Gary,Ind. C3 ..... 3.95
Houston,Tex. S5 ..... 4.35
Ind.Harbor,Ind. I-2, Y1.3.95
Johnstown,Pa. B2 ..... 3.95
KansasCity,Mo. S5 .... 4.55
Lackawanna,N.Y. B2 .. 3.95
LosAngeles B3 ..... 5.00
Massillon,O. R2 ..... 3.95
Midland,Pa. C18 ..... 3.95
So.Chicago-C3, R2, W14.3.95
So.Duquesne,Pa. C3 .... 3.95
Struthers,O. Y1 ..... 3.95
Warren,O. C17 ..... 3.95
Youngstown C3 ..... 3.95

BARS, Hot-Rolled Ingot Iron
Ashland,Ky.(17) A10 .. 3.70

BARS & SMALL SHAPES, H.R., High-Strength Low-Alloy
Aliquippa,Pa. J5 ..... 5.20
Bessemer,Ala. T2 ..... 5.20
Bethlehem,Pa. B2 ..... 5.20
Clairton,Pa. C3 ..... 5.20
Cleveland R2 ..... 5.20
Ecorse,Mich. G5 ..... 5.40
Fairfield,Ala. T2 ..... 5.20
Fontana,Calif. K1 ..... 6.25
Gary,Ind. C3 ..... 5.20
Ind.Harbor,Ind. I-2, Y1..5.20
Johnstown,Pa. B2 ..... 5.20
Lackawanna,N.Y. B2 .. 5.20
Pittsburgh J5 ..... 5.20
So.Duquesne,Pa. C3 .... 5.20
Struthers,O. Y1 ..... 5.20
Youngstown C3 ..... 5.20

BARS, Cold-Finished Carbon
Aliquippa,Pa. K5 ..... 4.15
Ambridge,Pa. W18 ..... 4.15
BeaverFalls,Pa. M12,R2.4.15
Buffalo B5 ..... 4.15
Camden,N.J. P13 ..... 4.63
Carnegie,Pa. C12 ..... 4.15
Chicago W18 ..... 4.15
Cleveland A7, C20 .... 4.15
Detroit P17 ..... 4.30
Donora,Pa. A7 ..... 4.15
Ecorse,Mich. G5 ..... 4.35
Elyria,O. W8 ..... 4.15
FranklinPark,Ill. N5 .. 4.15
Gary,Ind. R2 ..... 4.15
Hammond,Ind. L2, M13 4.15
Hartford,Conn. R2 ..... 4.55
Harvey,Ill. B5 ..... 4.15
LosAngeles R2 ..... 5.55
Mansfield,Mass. B5 .... 4.55
Massillon,O. R2, R8 .... 4.15
Midland,Pa. C18 ..... 4.15
Monaca,Pa. S17 ..... 4.15
Newark,N.J. W18 ..... 4.55
Plymouth,Mich. P5 .... 4.40
Pittsburgh J5 ..... 4.10
Putnam,Conn. W18 ..... 4.55
Readville,Mass. C14 .... 4.55
St.Louis,Mo. M5 ..... 4.55
So.Chicago,Ill. W14 .... 4.15
SpringCity,Pa.(5) K3 .. 4.55
Struthers,O. Y1 ..... 4.15
Waukegan,Ill. A7 ..... 4.15
Youngstown F3, Y1 .... 4.15

BARS, Cold-Finished Alloy
Aliquippa,Pa. K5 ..... 4.90
Ambridge,Pa. W18 .... 4.90
BeaverFalls,Pa. M12 .... 4.90
Bethlehem,Pa. B2 ..... 4.90
Buffalo B5 ..... 4.90
Canton,O. R2, T7 ..... 4.90
Carnegie,Pa. C12 ..... 4.90
Chicago W18 ..... 4.90
Cleveland A7, C20 ..... 4.90
Detroit P17 ..... 5.05
Donora,Pa. A7 ..... 4.90
Elyria,O. W8 ..... 4.90
Gary,Ind. R2 ..... 4.90
Hammond,Ind. L2, M13.4.90
Hartford,Conn. R2 ..... 5.20
Harvey,Ill. B5 ..... 4.90
Lackawanna,N.Y. B2 .. 4.90
Mansfield,Mass. B5 .... 5.20
Massillon,O. R2, R8 .... 4.90
Midland,Pa. C18 ..... 4.90
Monaca,Pa. S17 ..... 4.90
Newark,N.J. W18 ..... 5.20
Plymouth,Mich. P5 .... 5.10
So.Chicago,Ill. R2, W14.4.90
Struthers,O. Y1 ..... 4.90
Waukegan,Ill. A7 ..... 4.90
Warren,O. C17 ..... 4.90
Worcester,Mass A7 ..... 5.20
Youngstown F3, Y1 .... 4.90

RAIL STEEL BARS
ChicagoHts. (3) C2, I-2.3.30
ChicagoHts. (4) C2, I-2.3.45
Franklin,Pa. (3) F5 ... 3.30
Franklin,Pa. (4) F5 ... 3.45
FortWorth,Tex.(26) T4.4.33
Huntngtn,W.Va.(3) W7.3.45
Moline,Ill.(3) R2 ..... 3.40
SouthAvis,Pa.(2) JS 3.30
SouthAvis,Pa.(41) JS .. 3.30
SouthAvis,Pa.(42) JS .. 3.30
Williamsport(2,3) S19 .. 3.45

BARS, Wrought Iron
Economy,Pa.(S.R.) B14.9.50
Economy,Pa.(D.R.)B14 11.00
Economy,(Staybolt)B14 11.30
Dover,N.J.(Staybolt)U1 15.00
Dover(Eng.Bolt) U1 ... 13.50
Dover(Wrgt.Iron) U1.. 12.25
McK.Rks.(S.R.) L5 .... 8.60
McK.Rks.(D.R.) L5 ... 11.25
McK.Rks.(Staybolt) L5.12.75

BARS, Reinforcing
(Fabricated; to Consumers)
Huntington,W.Va. W7 .. 4.50
Johnstown, ¼-1" B2 ... 4.35
LosAngeles B3 ..... 5.00
Seattle B3, N14 ..... 5.10
SouthAvis,Pa. J5 ..... 4.35
So.SanFrancisco B3 .... 5.00
SparrowsPt., ¼-1" B2 .. 4.35
Williamsport,Pa. S19 .. 4.35

BARS, Reinforcing (Fabricators)
AlabamaCity,Ala. R2 .. 3.45
Alton,Ill.(6) L1 ..... 3.45
Atlanta,Ga. A11 ..... 3.60
Buffalo R2 ..... 3.45
Cleveland R2 ..... 3.45
Emeryville,Calif. J7 .... 4.20
Fairfield,Ala. T2 ..... 3.45
Fontana,Calif. K1 ..... 4.10
Gary,Ind. C3 ..... 3.45
Houston,Tex. S5 ..... 3.85
Ind.Harbor,Ind. I-2,Y1..3.45
Johnstown,Pa. B2 ..... 3.45
KansasCity,Mo. S5 .... 4.05
Lackawanna,N.Y. B2 .. 3.45
LosAngeles B3 ..... 4.15
Milton,Pa. B6 ..... 3.45
Minnequa,Colo. C10 .... 4.25
Niles,Calif. P1 ..... 4.17
Pittsburg,Calif. C11 .... 4.15
Pittsburgh J5 ..... 3.45
Portland,Oreg. O4 ..... 4.20
SandSprings,Okla. S5 .. 4.35
Seattle,Wash. B3, N14 .. 4.20
SouthAvis,Pa. J5 ..... 3.45
So.Chicago,Ill. R2 ..... 3.45
So.Duquesne,Pa. C3 .... 3.45
So.SanFrancisco B3 .... 4.20
SparrowsPoint,Md. B2.. 3.45
Struthers,O. Y1 ..... 3.45
Torrance,Calif. C11 .... 4.15
Youngstown C3, R2 .... 3.45

BAR SHAPES, Hot-Rolled Alloy
Clairton,Pa. C3 ..... 4.20
Fontana,Calif. K1 ..... 4.95
Gary,Ind. C3 ..... 4.20
Youngstown C3 ..... 4.20

SHEETS, Hot-Rolled Steel (18 gage and heavier)
AlabamaCity,Ala. R2 .. 3.35
Ashland,Ky.(8) A10 .... 3.35
Butler,Pa. A10 ..... 3.35
Cleveland J5, R2 ..... 3.35
Conshohocken,Pa. A3 .. 3.45
Detroit M1 ..... 4.15
Ecorse,Mich.(8) G5 .... 3.55
Fairfield,Ala. T2 ..... 3.35
Fontana,Calif. K1 ..... 4.25
Gary,Ind. C3 ..... 3.35
Ind.Harbor,Ind. I-2, Y1.3.35
Irvin,Pa. C3 ..... 3.35
Lackawanna,N.Y. B2 .. 3.35
Munhall,Pa. C3 ..... 3.35
Niles,O. M4 ..... 3.75
Pittsburg,Calif. C11 .... 4.05
Pittsburgh J5 ..... 3.35
Sharon,Pa. S3 ..... 3.35
So.Chicago,Ill. W14 .... 3.35
SparrowsPoint,Md. B2 .. 3.35
Steubenville,O. W10 .... 3.35
Torrance,Calif. C11 .... 4.05
Warren,O. R2 ..... 3.35
Weirton,W.Va. W6 .... 3.35
Youngstown C3, Y1 .... 3.35

SHEETS, Hot-Rolled Carbon Steel (19 gage and lighter)
AlabamaCity,Ala. R2 .. 4.50
Dover,O. R1 ..... 4.65
Ind.Harbor,Ind. I-2 .... 4.40
Mansfield,O. E6 ..... 4.15
Niles,O. N12 ..... 4.10
Niles,O. M4 ..... 4.65
Torrance,Calif. C11 .... 5.15

SHEETS, H-R (14 ga., heavier) High-Strength Low-Alloy
Cleveland J5, R2 ..... 5.05
Conshohocken,Pa. A3 .. 5.05
Ecorse,Mich. G5 ..... 5.25
Fairfield,Ala. T2 ..... 5.05
Fontana,Calif. K1 ..... 6.74
Gary,Ind. C3 ..... 5.05
Ind.Harbor,Ind. I-2, Y1.5.05
Irvin,Pa. C3 ..... 5.05
Lackawanna(35) B2 .... 5.05
Pittsburgh J5 ..... 5.05
Sharon,Pa. S3 ..... 5.05
So.Chicago,Ill. C2 .... 5.05
SparrowsPoint(36) B2 .. 5.05
Warren,O. R2 ..... 5.05
Weirton,W.Va. W6 .... 5.05
Youngstown, C3, Y1 .... 5.05

SHEETS, Cold-Rolled High-Strength Low-Alloy
Cleveland J5, R2 ..... 6.20
Ecorse,Mich. G5 ..... 6.40
Fontana,Calif. K1 ..... 7.05
Gary,Ind. C3 ..... 6.20
Ind.Harbor,Ind. I-2, Y1.6.20
Irvin,Pa. C3 ..... 6.20
Lackawanna(37) B2 .... 6.20
Pittsburgh J5 ..... 6.20
Sharon,Pa. S3 ..... 6.20
SparrowsPoint(38) B2.. 6.20
Warren,O. R2 ..... 6.20
Weirton,W.Va. W6 .... 6.20
Youngstown Y1 ..... 6.20

SHEETS, Cold-Rolled Steel (Commercial Quality)

Butler,Pa. A10	4.10
Cleveland J5, R2	4.10
Ecorse,Mich. G5	4.30
Fairfield,Ala. T2	4.10
Follansbee,W.Va. F4	5.10
Fontana,Calif. K1	5.00
Gary,Ind. C3	4.10
GraniteCity,Ill. G4	4.30
Ind.Harbor,Ind. I-2, Y1	4.10
Irvin,Pa. C3	4.10
Lackawanna,N.Y. B2	4.10
Middletown,O. A10	4.10
Pittsburg,Calif. C11	5.05
Pittsburgh J5	4.10
SparrowsPoint,Md. B2	4.10
Steubenville,O. W10	4.10
Warren,O. R2	4.10
Weirton,W.Va. W6	4.10
Youngstown Y1	4.10

SHEETS, Gal'vd No. 10 Steel

AlabamaCity,Ala. R2	4.40
Ashland,Ky.(8) A10	4.40
Canton,O. R2	4.40
Delphos,O. N16	5.15
Dover,O. R1	4.75
Fairfield,Ala. T2	4.40
Gary,Ind. C3	4.40
GraniteCity,Ill. G4	4.60
Ind.Harbor,Ind. I-2	4.40
Irvin,Pa. C3	4.40
Kokomo,Ind. C16	4.50
MartinsFerry,O. W10	4.40
Niles,O. N12	4.65
Pittsburg,Calif. C11	5.15
SparrowsPoint,Md. B2	4.40
Steubenville,O. W10	4.40
Torrance,Calif. C11	5.15
Weirton,W.Va. W6	4.40

SHEETS, Galvanized No. 10, High-Strength Low Alloy

Irvin,Pa. C3	6.75
SparrowsPoint(39) B2	6.75

SHEETS, Galvannealed Steel

Canton,O. R2	4.95
Irvin,Pa. C3	4.95
Kokomo,Ind. C16	5.05
Niles,O. N12	5.20

SHEETS, ZINCGRIP Steel No. 10

Butler,Pa. A10	4.65
Middletown,O. A10	4.65

SHEETS, Electro Galvanized

Cleveland R2 (28)	5.25
Niles,O. R2 (28)	5.25
Weirton,W.Va. W6	5.10

SHEETS, Zinc Alloy

Ind.Harbor,Ind. I-2	5.05

SHEETS, Long Terne, Steel (Commercial Quality)

BeechBottom,W.Va. W10	4.80
Gary,Ind. C3	4.80
Mansfield,O. E6	4.80
Middletown,O. A10	4.80
Niles,O. N12	4.80
Weirton,W.Va. W6	4.80

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10	5.20

ROOFING SHORT TERNES (Package; 8 lb coated)

Gary,Ind. C3	$17.50
Yorkville,O. W10	17.50

MANUFACTURING TERNES (Special Coated)

Fairfield,Ala. T2	$6.45
Gary,Ind. C3	6.35
Irvin,Pa. C3	6.35
SparrowsPoint,Md. B2	6.45
Yorkville,O. W10	6.35

SHEETS, Lt. Coated Ternes, 6 lb

Yorkville,O. W10	$7.05

SHEETS, Mfg. Ternes, 8 lb

Gary,Ind. C3	$8.10
Warren,O. R2	8.10
Yorkville,O. W10	8.10

SHEETS, Culvert No. 16	**Cu Alloy**	**Cu Fe**
Ashland A10	5.20	...
Canton,O. R2	5.25	5.70
Fairfield,Ala. T2	5.20	5.45
Gary C3	5.20	5.45
IndianaHarbor I-2	5.20	5.45
Irvin,Pa. C3	5.20	5.45
Kokomo C16	5.40	...
MartinsFy,O. W10	5.20	5.45
Pittsburg,Cal. C11	5.95	...
SparrowsPt. B2	5.20	...
Torrance,Cal. C11	5.95	...

SHEETS, Culvert, No. 16 Corrugated Ingot Iron

Ashland,Ky. A10	5.45

SHEETS, Hot-Rolled Ingot Iron 18 Gage and Heavier

Ashland,Ky.(8) A10	3.60
Cleveland R2	3.95
Ind.Harbor,Ind. I-2	3.60
Warren,O. R2	3.95

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2	4.70
Middletown,O. A10	4.60
Warren,O. R2	4.70

SHEETS, Galvanized Ingot Iron No. 10 Flat

Ashland,Ky(8) A10	4.65
Canton,O. R2	5.15
Ind.Harbor,Ind. I-2	4.80

SHEETS, ZINCGRIP Ingot Iron

Butler,Pa. A10	4.90
Middletown,O. A10	4.90

SHEETS, WROUGHT IRON	**An'ld.**	**Galv.**
Apollo,Pa.	12.00	15.50

SHEETS, Well Casing

Torrance,Calif. C11	4.85

SHEETS, Drum Body

Pittsburg,Calif. C11	4.05
Torrance,Calif. C11	4.05

SHEETS, Aluminized

Butler,Pa. A10	7.75

TIN PLATE, Electrolytic (Base Box)	**0.25 lb**	**0.50 lb**	**0.75 lb**
Aliquippa,Pa. J5	$6.35	$6.60	$6.85
Fairfield,Ala. T2	6.45	6.70	6.95
Gary,Ind. C3	6.35	6.60	6.85
GraniteCity,Ill. G4	6.55	6.80	7.05
Ind.Harbor,Ind. I-2, Y1	6.35	6.60	6.85
Irvin,Pa. C3	6.35	6.60	6.85
Niles,O. R2	6.35	6.60	6.85
Pittsburg,Calif. C11	7.10	7.35	7.60
SparrowsPoint,Md. B2	6.45	6.70	6.95
Weirton,W.Va. W6	6.35	6.60	6.85
Yorkville,O. W10	6.35	6.60	6.85

SHEETS, SILICON, H.R. or C.R.(22 Ga.) COILS (Cut Lengths ½c lower)	**Field**	**Armature**	**Electric**	**Motor**	**Dynamo**
BeechBottom W10 (cut lengths)	...	...	6.70	7.95	8.75
Brackenridge,Pa. A4	...	...	7.20	8.45	9.25
GraniteCity,Ill. G4(cut lengths)	...	...	6.90	8.15	...
Ind.Harbor,Ind. I-2	6.40	6.70	(34)	...	...
Mansfield,O. E6 (cut lengths)	5.90	6.20	6.70	7.95	8.75
Niles,O. N12 (cut lengths)	...	6.20	6.70	...	...
Niles,O. M4 (24 Gage)	5.65	5.95	6.45	...	...
Parkersburg F4 (cut lengths)	...	...	6.70	7.95	8.75
Vandergrift,Pa. C3	...	6.70	7.20	8.45	9.25
Warren,O. R2	6.40	6.70	7.20	8.45	9.25
Zanesville,O. A10	...	6.70	7.20	8.45	9.25

SHEETS, SILICON (22 Gage Base) Coils (Cut Lengths ½c lower) Transformer Grade	**72**	**65**	**58**	**52**
BeechBottom W10 (cut lengths)	9.30	9.85	10.55	11.35
Brackenridge,Pa. A4	9.80	10.35	11.05	....
Parkersburg F4 (cut lengths)	9.30	....	....	....
Vandergrift,Pa. C3	9.80	10.35	11.05	11.85
Warren,O. R2	9.80	....	....	....
Zanesville,O. A10	9.80	10.35	11.05	11.85

H.R. or C.R. COILS AND CUT LENGTHS, SILICON (22 Ga.)	**T-100**	**T-90**	**T-80**	**T-73**
Vandergrift,Pa. C3	12.35	13.20	14.20	14.70

TIN PLATE, American COKE (Base Box)	**1.25 lb**	**1.50 lb**
Aliquippa J5	$7.30	$7.50
Fairfield,Ala. T2	7.40	7.60
Gary C3	7.30	7.50
Gran.City,Ill. G4	7.50	7.70
Ind.Harbor I-1, Y1	7.30	7.50
Irvin,Pa. C3	7.30	7.50
Pitts.Cal. C11	8.05	8.25
Sp.Pt.,Md. B2	7.40	7.60
Warren R2	7.30	7.50
Weirton W6	7.30	7.50
Yorkville,O. W10	7.30	7.50

CANMAKING BLACK PLATE (Base Box)

Aliquippa,Pa. J5	$5.60
Fairfield,Ala. T2	5.70
Gary,Ind. C3	5.60
GraniteCity,Ill. G4	5.80
Ind.Harbor,Ind. I-2, Y1	5.60
Irvin,Pa. C3	5.60
Niles,O. R2	5.60
Pittsburg,Calif. C11	6.35
SparrowsPoint,Md. B2	5.70
Warren,O. R2	5.60
Weirton,W.Va. W6	5.60
Yorkville,O. W10	5.60

HOLLOWARE ENAMELING Black Plate (29 gage)

Aliquippa,Pa. J5	5.30
Follansbee,W.Va. F4	5.30
Gary,Ind. C3	5.30
GraniteCity,Ill. G4	5.50
Ind.Harbor,Ind. Y1	5.30
Irvin,Pa. C3	5.30
Niles,O. R2	5.30
SparrowsPoint,Md. B2	5.40
Warren,O. R2	5.30
Yorkville,O. W10	5.30

SHEETS, Enam'lg. Iron

Ashland,Ky.(8) A10	4.40
Cleveland R2	4.40
Ecorse,Mich. G5	4.70
Gary,Ind. C3	4.40
GraniteCity,Ill. G4	4.60
Ind.Harbor,Ind. I-2	4.40
Irvin,Pa. C3	4.40
Middletown,O. A10	4.40
Niles,O. M4	4.90
Youngstown Y1	4.40

STRIP, Hot-Rolled, High-Strength Low-Alloy

Bessemer,Ala. T2	4.95
Conshohocken,Pa. A3	4.95
Ecorse,Mich. G5	5.15
Fairfield,Ala. T2	4.95
Fontana,Cal. K1	6.64
Gary,Ind. C3	4.95
Ind.Harb.,Ind. I-2, Y1	4.95
Lackawanna,N.Y. B2	4.95
Sharon,Pa. S3	4.95
SparrowsPoint,Md. B2	4.95
Warren,O. R2	4.95
Weirton,W.Va. W6	4.95
Youngstown C3, Y1	4.95

STRIP, Hot-Rolled Alloy

Bridgeprt,Conn.(10) S15	5.10
Carnegie,Pa. S18	5.10
Fontana,Calif. K1	6.30
Gary,Ind. C3	5.10
Houston,Tex. S5	5.50
KansasCity,Mo. S5	5.70
NewBritn,Conn.(10) S15	5.10
Sharon,Pa. S3	5.10
Youngstown C3	5.10

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10	3.50
Warren,O. R2	3.85

STRIP, Hot-Rolled Carbon

Alton,Ill.(1) L1	3.25
Ashland,Ky.(8) A10	3.25
Atlanta A11	3.40
Bessemer,Ala. T2	3.25
Bridgeprt,Conn.(10) S15	3.25
Butler,Pa. A10	3.25
Carnegie,Pa. S18	3.25
Conshohocken,Pa. A3	3.35
Detroit M1	4.05
Ecorse,Mich. G5	3.45
Fairfield,Ala. T2	3.25
Fontana,Calif. K1	4.40
Gary,Ind. C3	3.25
Houston,Tex. S5	3.65
Ind.Harbor,Ind. I-2, Y1	3.25
KansasCity,Mo.(9) S5	3.85
Lackawanna,N.Y. B2	3.25
LosAngeles B3	4.00
Milton,Pa. B6	3.25
Minnequa,Colo. C10	4.30
NewBritain(10) S15	3.25
N.Tonawanda,N.Y. B11	3.25
Pittsburg,Calif. C11	4.00
Riverdale,Ill. A1	3.25
SanFrancisco S7	4.00
Seattle B3, N14	4.25
Sharon,Pa. S3	3.25
So.Chicago,Ill. W14	3.25
So.SanFrancisco B3	4.00
SparrowsPoint,Md. B2	3.25
Torrance,Calif. C11	4.00
Warren,O. R2	3.25
Weirton,W.Va. W6	3.25
WestLeechburg,Pa. A4	3.25
Youngstown C3, Y1	3.25

STRIP, Cold-Rolled Alloy Steel

Bridgprt,Conn.(10) S15	9.50
Carnegie,Pa. S18	9.50
Cleveland A7	9.50
Dover,O. G6	9.50
Harrison,N.J. C18	9.50
NewBritn,Conn.(10) S15	9.50
Pawtucket,R.I.(11) N8	9.50
Pawtucket,R.I.(12) N8	9.80
Sharon,Pa. S3	9.50
Worcester,Mass. A7	9.80
Youngstown C8	9.50

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2	4.75

STRIP, Cold-Finished, Spring Steel (Annealed)	**0.26-0.40C**	**0.41-0.60C**	**0.61-0.80C**	**0.81-1.05C**	**1.06-1.35C**
Bridgeport,Conn.(10) S15	4.15	5.95	6.55	8.50	10.80
Bristol,Conn. W1	...	...	6.85	8.80	....
Carnegie,Pa. S18	...	5.95	6.55	8.50	10.80
Cleveland A7	4.15	5.95	6.55	8.50	10.80
Dover,O. G6	4.15	5.95	6.55	8.50	10.80
FranklinPark,Ill. T6	4.40	6.10	6.70	8.65	....
Harrison,N.J. C18	....	...	6.85	8.80	11.10
Mattapan,Mass. T6	4.65	6.25	6.85	8.80	11.10
NewBritn.,Conn.(10) S15	4.15	5.95	6.55	8.50	10.80
NewCastle,Pa. B4	4.15	5.95	6.55	8.50	....
NewCastle,Pa. E5	4.15	5.95	6.55	8.50	10.80
NewYork W3	...	6.30	6.90	8.85	11.15
Pawtucket,R.I. N8: Cleve.orPitts.Base	4.70	5.95	6.55	8.50	10.80
Worcester,Base	4.65	6.25	6.85	8.80	11.10
Sharon,Pa. S3	4.15	5.95	6.55	8.50	10.80
Trenton,N.J. R5	...	6.25	6.85	8.80	11.10
Wallingford,Conn. W2	4.65	6.25	6.85	8.80	11.10
Weirton,W.Va. W6	4.15	5.95	6.55	8.50	10.80
Worcester,Mass. A7	4.45	6.25	6.85	8.80	11.10
Worcester,Mass. T6	4.65	6.25	6.85	8.80	11.10
Youngstown C8	4.50	5.95	6.55	8.50	10.80
Spring Steel (Tempered)					
Trenton,N.J. R5	...	...	9.30	11.25	13.85
Harrison,N.J. C18	...	...	9.30	11.25	13.85

STRIP, Cold-Rolled Carbon

Anderson,Ind.(40) G6	4.15
Berea,O. C7	6.60
Bridgprt,Conn.(10) S15	4.15
Butler,Pa. A10	4.15
Cleveland A7, J5	4.15
Dearborn,Mich. D3	4.40
Detroit, D2	4.40
Detroit M1	4.95
Dover,O.(40) G6	4.15
Ecorse,Mich. G5	4.35
Follansbee,W.Va. F4	4.15
Fontana,Calif. K1	5.40
FranklinPark,Ill. T6	4.30
Ind.Harbor,Ind. I-2	4.30
LosAngeles C1	5.50
Mattapan,Mass.(21) T6	4.65
Middletown,O. A10	4.15
NewBritain(10) S15	4.15
NewCastle,Pa. B4	4.15
NewCastle,Pa.(40) E5	4.15
NewHaven,Conn. A7, D2	4.65
New York W3	5.00
Pawtucket,R.I.(21) N8	4.65
Riverdale,Ill. A1	4.30
Rome,N.Y. R6	4.15
Sharon,Pa. S3	4.15
SparrowsPoint,Md. B2	4.15
Trenton,N.J.(13) R5	4.65
Wallingford,Conn. W2	4.65
Warren,O.(40) T5	4.15
Warren,O. R2	4.15
Weirton,W.Va. W6	4.15
Youngstown C8, Y1	4.15

STRIP, Cold-Rolled, High-Strength Low-Alloy

Cleveland A7, J5	6.20
Dover,O. G6	6.20
Ecorse,Mich. G5	6.40
Fontana,Calif. K1	6.95
Lackawanna,N.Y., B2	6.40
Sharon,Pa. S3	6.20
SparrowsPoint,Md. B2	6.40
Warren,O. R2	6.20
Weirton, W. Va. W6	6.20
Youngstown Y1	6.20

STRIP, Electro Galvanized

Weirton,W.Va. W6	4.15
Youngstown C8	4.15

Key to Producing Companies

A1 Acme Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A7 American Steel & Wire
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A13 American Cladmetals Co.
B1 Babcock & Wilcox Tube
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B6 Boiardi Steel Corp.
B8 Braeburn Alloy Steel
B11 Buffalo Bolt Co.
B14 A. M. Byers Co.
C1 Calif. Cold Rolled Steel
C2 Calumet Steel Div., Borg-Warner Corp.
C3 Carnegie-Illinois Steel
C4 Carpenter Steel Co.
C5 Central Iron & Steel Div. Barium Steel Corp.
C7 Cleve.Cold.Roll.Mills Co.
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia Steel Co.
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
D2 Detroit Steel Corp.
D3 Detroit Tube & Steel
D4 Disston & Son, Henry
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.
F2 Firth Sterling Steel
F3 Fitzsimons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
G1 Geneva Steel Co.
G2 Globe Iron Co.
G3 Globe Steel Tubes Co.
G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.
H1 Hanna Furnace Corp.
H4 Heppenstall Co.
I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.
K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K5 Kidd Drawn Steel Co.
L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Electric Steel
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

UNIVERSITY OF MICHIGAN LIBRARIES

TIGHT COOPERAGE HOOP

Atlanta A11	3.60
Riverdale,Ill. A1	3.40
Sharon,Pa. S3	3.40
Youngstown C3	3.40

WIRE, MB Spring, HighCarbon

Aliquippa,Pa. J5	5.90
Alton,Ill.(1) L1	5.90
Bartonville,Ill.(1) K4	5.90
Buffalo W12	5.90
Cleveland A7	5.90
Donora,Pa. A7	5.90
Duluth A7	5.90
Fostoria,O. S1	5.90
Johnstown,Pa. B2	5.90
LosAngeles B3	6.85
Milbury,Mass(12) N6	6.20
Monessen,Pa. P7, P16	5.90
Palmer,Mass. W12	6.20
Pittsburg,Calif. C11	6.85
Portsmouth,O. P12	5.90
Roebling,N.J. R5	6.20
So.Chicago,Ill. R2	5.90
SparrowsPoint,Md. B2	6.00
Struthers,O. Y1	5.90
Trenton,N.J. A7	6.20
Waukegan,Ill. A7	5.90
Worcester A7,J4,T6,W12	6.20

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	5.35
Buffalo W12	5.35
Cleveland A7	5.35
Crawfordsville,Ind. M8	5.35
Dover,O. G6	5.35
Fostoria,O. S1	5.50
Kokomo,Ind. C16	5.35
FranklinPark,Ill. T6	5.70
Massillon,O. R8	5.35
Monessen,Pa. P7, P16	5.35
Pawtucket,R.I.(12) N8	5.65
Trenton,N.J. R5	5.65
Worcester A7, T6, W12	5.65

WIRE, Fine and Weaving (8-in. Coils)

Bartonville,Ill.(1) K4	8.45
Buffalo W12	8.45
Chicago W13	8.45
Cleveland A7	8.45
Crawfordsville,Ind. M8	8.45
Fostoria,O. S1	8.45
Johnstown,Pa. B2	8.45
Kokomo,Ind. C16	8.45
Monessen,Pa. P16	8.45
Palmer,Mass. W12	8.75
Portsmouth,O. P12	8.45
Roebling,N.J. R5	8.75
Waukegan,Ill. A7	8.45
Worcester,Mass. A7, T6	8.75

WIRE, Tire Bead

Monessen,Pa. P16	10.80
Roebling,N.J. R5	10.80

WIRE, Manufacturers Bright, Low-Carbon

AlabamaCity,Ala. R2	4.50
Aliquippa,Pa. J5	4.50
Atlanta A11	4.60
Alton,Ill.(1) L1	4.50
Bartonville,Ill.(1) K4	4.50
Buffalo W12	4.50
Chicago W13	4.50
Cleveland A7, C20	4.50
Crawfordsville,Ind. M8	4.60
Donora,Pa. A7	4.50
Duluth A7	4.50
Fairfield,Ala. T2	4.50
Fostoria,O.(24) S1	4.85
Houston S5	4.90
Johnstown,Pa. B2	4.50
Joliet,Ill. A7	4.50
KansasCity,Mo. S5	5.10
Kokomo,Ind. C16	4.60
Los Angeles B3	5.45
Minnequa,Colo. C10	4.75
Monessen,Pa. P7	4.50
Newark, 6-8ga. I-1	5.15
No.Tonawanda B11	4.90
Palmer,Mass. W12	4.80
Pittsburg,Calif. C11	5.45
Portsmouth,O. P12	4.50
Rankin,Pa. A7	4.50
So.Chicago,Ill. R2	4.50
So.SanFrancisco C10	5.45
SparrowsPoint,Md. B2	4.60
Sterling,Ill(1) N15	4.50
Struthers,O. Y1	4.50
Torrance,Calif. C11	5.45
Waukegan,Ill. A7	4.50
Worcester,Mass. A7, T6	4.80

WIRE, Upholstery Spring

Aliquippa,Pa. J5	5.55
Alton,Ill.(1) L1	5.55
Buffalo W12	5.55
Cleveland A7	5.55
Donora,Pa. A7	5.55
Duluth A7	5.55
Johnstown,Pa. B2	5.55
LosAngeles B3	6.50
Monessen,Pa. P7, P16	5.55
NewHaven,Conn. A7	5.85
Palmer,Mass. W12	5.85
Pittsburg,Calif. C11	6.50
Portsmouth,O. P12	5.55
Roebling,N.J. R5	5.85
So.Chicago,Ill. R2	5.55
SparrowsPoint,Md. B2	5.65
Struthers,O. Y1	5.55
Torrance,Calif. C11	6.50
Trenton,N.J. A7	5.85
Waukegan,Ill. A7	5.55
Worcester,Mass. A7	5.85

WIRE, Galv'd ACSR for Cores

Monessen,Pa. P16	8.15
Roebling,N.J. R5	8.45
SparrowsPoint,Md. B2	8.25

WIRE Merchant Quality (6 to 8 gage)

	An'ld	Galv.
AlabamaCity R2	5.35	5.60
Aliquippa J5	5.35	5.60
Atlanta A11	5.45	5.70
Bartonville(19) K4	5.35	5.60
Buffalo(31) W12	4.50	...
Cleveland A7	5.35	5.60
Crawfordsvil. M8	5.45	5.70
Donora A7	5.35	5.60
Duluth A7	5.35	5.60
Fairfield T2	5.35	5.60
Houston,Tex. S5	5.75	6.00
Johnstown B2	5.35	5.60
Joliet,Ill. A7	5.35	5.60
KansasCy,Mo. S5	5.95	6.20
Kokomo C16	5.45	5.70
Los Angeles B3	6.30	...
Minnequa C10	5.60	5.85
Monessen P7	5.35	5.60
Palmer(31) W12	4.80	...
Pitts.,Cal. C11	6.30	6.55
Prtsmth.(18) P12	5.35	5.60
Rankin A7	5.35	5.60
So. Chicago R2	5.35	5.60
So.S.Fran. C10	6.30	6.55
SparrowsPt. B2	5.45	5.70
Sterling,Ill.(1)N15	5.35	5.60
Struthers,O. Y1	5.35	5.60
Torrance,Cal. C11	6.30	...
Worcester A7	5.65	5.90

WIRE (16 gage)

	An'ld Stone	Galv. Stone
Aliquippa J5	9.80	11.30
Bartonville(1) K4	9.80	11.30
Cleveland A7	9.80	11.30
Crawfrdvil. M8	9.80	11.30
Fostoria,O. S1	9.90	11.40
Johnstown B2	9.80	11.30
Kokomo C16	9.80	11.30
Minnequa C10	10.05	11.80
Palmer,Mass. W12	9.80	11.30
Pitts.,Cal. C11	10.15	11.65
Prtsmth.(18) P12	9.80	11.30
SparrowsPt. B2	9.90	11.40
Waukegan A7	9.80	11.30

WIRE, Barbed

	Col.
AlabamaCity, Ala. R2	126
Aliquippa,Pa. J5	126
Atlanta A11	128
Crawfordsville M8	128
Donora,Pa A7	126
Duluth,Minn. A7	126
Fairfield,Ala. T2	126
Houston,Tex. S5	134
Johnstown,Pa. B2	126
Joliet,Ill. A7	126
KansasCity,Mo. S5	138
Kokomo,Ind. C16	128
Minnequa,Colo. C10	131
Monessen,Pa. P7	126
Pittsburg,Calif. C11	146
Portsmouth,O.(18) P12	126
Rankin,Pa. A7	126
So.Chicago,Ill. R2	126
So.SanFran.,Calif. C10	146
SparrowsPoint,Md. B2	128
Sterling,Ill.(1) N15	126

FENCE POSTS

	Col.
ChicagoHts.,Ill. C2	116
Duluth A7	116
Franklin,Pa. F5	116
Huntington,W.Va. W7	116
Johnstown,Pa. B2	116
Joliet,Ill. A7	116
Minnequa,Colo. C10	121
Moline,Ill. R2	112
So.Chicago R2	116
Williamsport,Pa. S19	120

WOVEN FENCE, 9-15½ Ga. Col.

AlabamaCity, Ala. R2	116
Ala.City,Ala.,17-18ga.R2	198
Aliquippa,Pa.9-14½ga.J5	116
Atlanta A11	118
Bartonville,Ill.(19) K4	116
Crawfordsville,Ind. M8	118
Donora,Pa. A7	116
Duluth A7	116
Houston,Tex. S5	124
Fairfield,Ala. T2	116
Johnstown,Pa. B2	116
Johnstn,17ga.6" B2	190
Johnstn,17ga.,4" B2	193
Joliet,Ill. A7	116
KansasCity,Mo. S5	128
Kokomo,Ind. C16	118
Minnequa,Colo. C10	121
Monessen,Pa. P7	116
Pittsburg,Calif. C11	139
Portsmouth,O.(18) P12	116
Rankin,Pa. A7	116
So.Chicago,Ill. R2	116

BALE TIES, Single Loop Col.

AlabamaCity,Ala. R2	113
Atlanta A11	114
Bartonville,Ill.(19) K4	113
Chicago W13	113
Crawfordsville M8	115
Donora,Pa. A7	113
Duluth A7	113
Fairfield,Ala. T2	113
Joliet,Ill. A7	113
KansasCity, Mo. S5	125
Kokomo,Ind. C16	115
Minnequa,Colo. C10	118
Pittsburg,Calif. C11	137
Portsmouth,O.(18) P12	113
So.Chicago,Ill. R2	113
So.SanFran.,Calif. C10	137
SparrowsPoint,Md. B2	115
Sterling,Ill.(1) N15	113

NAILS & STAPLES, Stock To Dealers & Mfrs. (7) Col.

AlabamaCity,Ala. R2	106
Aliquippa,Pa. J5	106
Atlanta A11	108
Bartonville,Ill.(19) K4	106
Chicago,Ill. W13	106
Cleveland A9	112
Crawfordsville,Ind. M8	108
Donora,Pa. A7	106
Duluth A7	106
Fairfield,Ala. T2	106
Galveston,Tex. D7	114
Houston,Tex. S5	114
Johnstown,Pa. B2	106
Joliet,Ill. A7	106
KansasCity,Mo. S5	118
Kokomo,Ind. C16	108
Minnequa,Colo. C10	111
Monessen,Pa. P7	106
Pittsburg,Calif. C11	125
Portsmouth,O. P12	106
Rankin,Pa. A7	106
So.Chicago,Ill. R2	106
SparrowsPoint,Md. B2	108

NAILS & STAPLES, Non-Stock

AlabamaCity,Ala. R2	5.35
Bartonville,Ill.(19) K4	5.35
Crawfordsville,Ind. M8	5.45
Donora,Pa. A7	5.35
Duluth A7	5.35
Johnstown,Pa. B2	5.35
Joliet,Ill. A7	5.35
Kokomo,Ind. C16	5.45
Minnequa,Colo. C10	5.60
Pittsburg,Calif. C11	6.30
Portsmouth,O. P12	5.35
Rankin,Pa. A7	5.35
So.Chicago,Ill. R2	5.35
SparrowsPoint,Md. B2	5.45
Worcester,Mass. A7	5.65

NAILS, Cut (100 lb keg) To dealers (33)

Conshohocken,Pa. A3	$6.75
Wheeling,W.Va. W10	6.75

AXLES

Fairfield,Ala. T2	5.25
Gary,Ind. C3	5.25
Ind.Harbor,Ind. S13	5.25
Johnstown,Pa. B2	5.25
McKeesRocks,Pa. C3	5.25

TIE PLATES

Fairfield,Ala. T2	4.20
Gary,Ind. C3	4.20
Ind.Harbor,Ind. I-2	4.20
Lackawanna,N. Y. B2	4.20
Minnequa,Colo. C10	4.20
Pittsburgh,Calif. C11	4.35
Pittsburgh R2	4.20
Seattle I-3	4.35
Steelton,Pa. B2	4.20
Torrance,Calif. C11	4.35
Weirton,W. Va. W6	4.20

JOINT BARS

Bessemer,Pa. C3	3.40
Fairfield,Ala. T2	4.40
Ind.Harbor,Ind. I-2	4.40
Joliet,Ill. C3	4.40
Lackawanna,N.Y. B2	4.40
Minnequa,Colo. C10	4.40
Sheelton,Pa. B2	4.40

TRACK BOLTS (20) Treated

Fairfield,Ala. T2	9.10
KansasCity,Mo. S5	9.10
Lebanon,Pa.(32) B2	8.85
Minnequa,Colo. C10	8.85
Pittsburgh O3, P14	9.10
Seattle B3	9.35

STANDARD TRACK SPIKES

Fairfield,Ala. T2	5.60
Ind.Harbor,Ind. I-2, Y1	5.60
KansasCity,Mo. S5	5.85
Lebanon,Pa. B2	5.60
Minnequa,Colo, C10	5.60
Pittsburgh J5	5.60
Seattle B3	6.10
So.Chicago,Ill. R2	5.60
Struthers,O. Y1	5.60
Youngstown R2	5.60

ROPE WIRE

	Mild Plow	Plow	Imp. Plow
Bartonville,Ill. K4	8.05	8.05	8.30
Buffalo W12	8.05	8.05	8.30
Cleveland A7	8.05	8.05	8.30
Donora,Pa. A7	8.05	8.05	8.30
Fostoria,O. S1	8.05	8.05	8.30
Johnstown,Pa. B2	8.05	8.05	8.30
Monessen,Pa. P7, P16	8.05	8.05	8.30
NewHaven,Conn. A7	8.35	8.35	8.60
Palmer,Mass. W12	8.35	8.35	8.60
Portsmouth,O. P12	8.05	8.05	8.30
Roebling,N.J. R5	8.35	8.35	8.60
SparrowsPoint,Md. B2	8.15	8.15	8.40
Struthers,O. Y1	8.05	8.05	8.30
Trenton,N.J. A7	8.35	8.35	8.60
Waukegan,Ill. A7	8.05	8.05	8.30
Williamsport,Pa. B2	8.15	8.15	8.40
Worcester,Mass. J4, T6	8.35	8.35	8.60

RAILS

	Std. No. 1	Std. No. 2	Std. All No. 2	TeeRails 60 lb Under
Bessemer,Pa. C3	3.40	3.30	3.35	3.75
Ensely,Ala. T2	3.40	3.30	...	3.75
Fairfield,Ala T2	...	...	...	3.75
Gary,Ind. C3	3.40	3.30	3.35	...
Huntington,W.Va. W7	...	...	...	3.75
Ind.Harbor,Ind. I-2	3.40	3.30	3.35	...
Johnstown,Pa. B2	...	...	...	(16)3.75
Lackawanna B2	3.40	3.30	...	3.75
Minnequa,Colo. C10	3.40	3.30	...	4.25
Steelton,Pa. B2	3.40	3.30	...	...
Williamsport,Pa. S19	...	...	...	3.75

Key to Producing Companies

M1	McLouth Steel Corp.	P12	Portsmouth Division, Detroit Steel Corp.
M4	Mahoning Valley Steel	P13	Precision Drawn Steel
M5	Medart Co.	P14	Pitts. Screw & Bolt Co.
M6	Mercer Tube & Mfg. Co.	P15	Pittsburgh Metallurgical
M8	Mid-States Steel & Wire	P16	Page Steel & Wire Div., Amer. Chain & Cable
M9	Midvale Co.	P17	Plymouth Steel Co.
M10	Missouri-Illinois Furnace		
M12	Moltrup Steel Products	R1	Reeves Steel & Mfg. Co.
M13	Monarch Steel Co.	R2	Republic Steel Corp.
M14	McInnes Steel Co.	R3	Rhode Island Steel Corp.
N2	National Supply Co.	R5	Roebling's Sons, John A.
N3	National Tube Co.	R6	Rome Strip Steel Co.
N5	Nelsen Steel & Wire Co.	R7	Rotary Electric Steel Co.
N6	New Eng.HighCarb.Wire	R8	Reliance Div., EatonMfg.
N8	Newman-Crosby Steel		
N12	Niles Rolling Mill Co.	S1	Seneca Wire & Mfg. Co.
N14	Nrthwst. Steel Roll. Mills	S3	Sharon Steel Corp.
N15	Northwestern S.&W. Co.	S5	Sheffield Steel Corp.
N16	New Delphos Mfg. Co.	S6	Shenango Furnace Co.
O3	Oliver Iron&Steel Corp.	S7	Simmons Co.
O4	Oregon Steel Mills	S8	Simonds Saw & Steel Co.
P1	Pacific States Steel Corp.	S9	Sloss-Sheffield S.&I. Co.
P2	Pacific Tube Co.	S13	Standard Forgings Corp.
P4	Phoenix Iron & Steel Co.	S14	Standard Tube Co.
P5	Pilgrim Drawn Steel	S15	Stanley Works
P6	Pittsburgh Coke&Chem.	S16	Struthers Iron & Steel
P7	Pittsburgh Steel Co.	S17	Superior Drawn Steel Co.
P9	Pittsburgh Tube Co.	S18	Superior Steel Corp.
P11	Pollak Steel Co.	S19	Sweet's Steel Co.
T2	Tenn. Coal, Iron & R.R.		
T3	Tenn. Prod. & Chem.		
T4	Texas Steel Co.		
T5	Thomas Steel Co.		
T6	Thompson Wire Co.		
T7	Timken Roller Bearing		
T9	Tonawanda Iron Div. Am. Rad. & Stan. San.		
U1	Ulster Iron Works		
U4	Universal Cyclops Steel		
V2	Vanadium Alloys Steel		
V3	Vulcan Crucible Steel Co.		
W1	Wallace Barnes Co.		
W2	Wallingford Steel Co.		
W3	Washburn Wire Co.		
W4	Washington Steel Corp.		
W6	Weirton Steel Co.		
W7	W. Va. Steel & Mfg. Co.		
W8	Wsrn.Auto. Mach.Screw		
W9	Wheatland Tube Co.		
W10	Wheeling Steel Corp.		
W12	Wickwire Spencer Steel Div., Colo. Fuel & Iron		
W13	Wilson Steel & Wire Co.		
W14	Wisconsin Steel Div., International Harvester		
W15	Woodward Iron Co.		
W16	Worth Steel Co.		
W18	Wyckoff Steel Co.		
Y1	Youngstown Sheet & Tube		

TOOL STEEL

Grade	Cents per lb	Grade	Cents per lb
Reg. Carbon	21.00	18W,4Cr,3V	126.00
Extra Carbon	24.50	18W,4Cr,2V,9Co	185.50
Spec. Carbon	29.50	18W,4Cr,2V,6Co	169.50
Oil Hardening	32.00	18.25W,4.25Cr,1V,4.75Co	156.50
Cr Hot Wrk.	32.00	20.25W,4.25Cr,1.6V,12.25Co	293.50
Hi-Carbon-Cr	57.50	1.5W,4Cr, 1V,8.5Mo	71.50
18W,4Cr,1V	100.00	6.4W,4.5Cr,1.9V,5Mo.	76.50
18W,4Cr,2V	113.00	6W,4Cr,3V,6Mo	97.00

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, D4, F2, H4, J3, L3, M9, M14, R2, S8, T7, U4, V2, V3.

(1) Chicago Base. (2) Angles. (3) Merchant. (4) Reinforcing. (5) Philadelphia del. (6) Chicago or Birm. Base. (7) To jobbers, 3 cols. lower. (8) 16 gage and heavier. (9) 6 in. and narrower. (10) Pittsburgh Base. (11) Cleveland & Pittsburgh Base. (12) Worcester, Mass. Base. (13) 3" & wider; over ⅛" to under 3" 5.15c. (14) Also wide flange beams. (15) ⅛" and thinner. (16) 40 lb and under. (17) Flats only. (18) To dealers. (19) Chicago & Pittsburgh Base. (20) Deduct 0.25c for untreated. (21) New Haven, Conn. Base. (22) Del. San Fran. Bay area. (23) Angles 1"x1" to 1¼"x1¼" only. (24) Deduct 0.35c for finer than 15 Ga. (26) Reinforcing, mill shipments; to consumers, 4.83c; fabricated to fabricators, 4.58c. (28) Bonderized. (31) Not annealed. (32) Untreated. (33) To jobbers, deduct 20 cents. (34) 6.70c for cut lengths. (35) 72" and narrower. (36) 54" and narrower. (37) 15 Ga. & lighter; 60" & narrower. (38) 14 Ga. & lighter; 48" & narrower. (39) 48" and narrower. (40) Lighter than 0.035"; 4.40c, 0.035" and heavier. (41) Flats. (42) Bands.

STANDARD PIPE, T. & C.

BUTTWELD Size Inches	List Per Ft	Pounds Per Ft	Carload Discounts from List, % Black A	Black B	Black C	Galvanized D	Galvanized E	Galvanized F
⅛	5.5c	0.24	36.5	34.5	35.5	8.5	9.0	7.5
¼	6.0	0.42	33.5	31.5	32.5	9.5	11.0	8.5
⅜	6.0	0.57	29.0	27.0	28.0	5.5	8.0	4.5
½	8.5	0.85	40.5	38.5	39.5	24.0	22.0	23.0
¾	11.5	1.13	43.5	41.5	42.5	28.0	26.0	27.0
1	17.0	1.68	46.0	44.0	45.0	31.0	29.0	30.0
1¼	23.0	2.28	46.5	44.5	45.5	31.5	29.5	30.5
1½	27.5	2.73	47.0	45.0	46.0	32.0	30.0	31.0
2	37.0	3.68	47.5	45.5	46.5	32.5	30.5	31.5
2½	58.5	5.82	48.0	46.0	47.0	33.0	31.0	32.0
3	76.5	7.62	48.0	46.0	47.0	33.0	31.0	32.0

Column A: Etna, Pa. N2; Monaca, Pa. P9; Sharon, Pa. M6; Butler, Pa. ⅛-⅜", F6; Benwood, W. Va., 1½ percentage points lower on ⅛", 2 points lower on ¼", 3 points lower on ⅜", W10. Wheatland, Pa., 2 pts lower on ⅛" through ⅜", W9. Following make ½" and larger: Lorain, O. N3; Youngstown, plus 42% on 3½" and 4", R2; Youngstown Y1; Aliquippa, Pa. J5. Fontana, Calif. K1 quotes 11 points lower on ½" and larger continuous weld and 31% on 3½" and 4".

Columns B & E: Sparrows Point, Md. B2.

Columns C & F: Indiana Harbor, Ind., ½" through 3", Y-1; Alton, Ill. (Lorain, O., base) L1 quotes 2 points lower on ⅛", ¼", ⅜".

Column D: Etna, Pa. N2; Monaca, Pa. P9; Sharon, Pa. M6; Butler, Pa., ⅛" through ⅜", F6; Benwood, W. Va., except 3½ points lower on ⅛", 2½ pts on ¼", 3 pts on ⅜", W10. Wheatland, Pa., except 2 pts lower on ⅛" through ⅜", W9. Following make ½" and larger: Lorain, N3; Youngstown, plus 26.5% on 3½" and 4", R2; Youngstown, Y1; Aliquippa, Pa. J5. Fontana, Calif. K1 quotes 11 points lower on ½" and larger continuous weld and 15.5% on 3½" and 4".

SEAMLESS AND ELECTRIC WELD Size Inches	List Per Ft	Pounds Per Ft	Carload Discounts from List, % Seamless Black A	Seamless Galv. B	Elec. Weld Black C	Elec. Weld Galv. D
2	37.0c	3.68	36.0	20.5	36.0	20.5
2½	58.5	5.82	39.0	23.5	39.0	23.5
3	76.5	7.62	39.0	23.5	39.0	23.5
3½	92.0	9.20	41.0	25.5	41.0	25.5
4	$1.09	10.89	41.0	25.5	41.0	25.5
5	1.48	14.81	41.0	25.5	41.0	25.5
6	1.92	19.18	41.0	25.5	41.0	25.5

Column A: Aliquippa J5; Ambridge N2; Lorain N3; Youngstown Y1.

Column B: Aliquippa J5; Lorain, O. N3; Youngstown Y1.

Columns C & D: Youngstown R2.

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.	Elec. Weld C.D.
1	13	12.36	14.39	13.96	13.96
1¼	13	14.63	17.05	14.19	16.54
1½	13	16.17	19.02	15.68	18.45
1¾	13	18.39	21.64	17.84	20.99
2	13	20.61	24.24	19.99	23.51
2¼	13	22.96	27.03	22.27	26.22
2¼	12	25.29	29.76	24.53	28.87
2½	12	27.71	32.58	26.88	31.60
2¾	12	29.36	34.53	28.48	33.49
3	12	30.82	36.27	29.90	35.18
3¼	11	35.87	42.22	34.79	40.95
3½	11	38.52	45.35	37.36	43.99
4	10	47.82	56.25	46.39	54.56
4½	9	63.37	74.59	**61.47**	**72.35**
5	9	73.37	86.32	71.17	**83.73**
6	7	112.62	132.51	....	....

Boiler tube producers include Babcock & Wilcox Tube Co., National Tube Co., Globe Steel Tubes Co., Pittsburgh Steel Co., Republic Steel Corp., Standard Tube Co.

CLAD STEELS

(Cents per pound)

Cladding Stainless	Plates Carbon Base 10%	Plates Carbon Base 20%	Strip Cold-Rolled Carbon Base 10% Both Sides	Sheets Carbon Base 10%	Sheets Carbon Base 20%	Sheets Copper Base Both Sides
302	....	....	....	....	19.75	21.50–22.50	75.00
304	22.50	26.50	....	....	20.75	22.50–24.00	77.00
305	....	....	....	....	....	....	79.00
309	27.00	31.00	....	....	....	....	....
310	32.50	36.50	....	....	....	....	105.00
316	27.00	31.00	....	....	26.00	28.00–32.00	....
317	30.50	34.50	....	....	....	....	....
318	29.50	33.50	....	....	....	....	....
321	23.50	27.50	....	....	23.00	25.00	90.00
347	25.00	29.00	....	....	24.00	26.00–30.00	94.00
405	18.75	24.75	....	....	....	....	....
410	18.25	24.25	....	....	....	....	....
430	18.25	24.25	....	....	....	....	....
Nickel	27.50	34.50	31.50	41.00	....	....	88.00
Inconel	36.00	46.00	....	....	....	....	115.00
Monel	29.00	37.00	26.50	33.50	....	....	83.00
Copper*	....	....	20.35†	24.95‡	....	....	....

* Deoxidized. † 16.85c for hot-rolled. ‡ 21.70c for hot-rolled. Production points for carbon base products: Stainless plates, sheets, Conshohocken, Pa. A3 and New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. W16 and Coatesville L7; nickel, inconel, monel-clad plates, Coatesville L7; nickel, monel, copper-clad strip, Carnegie, Pa. S18. Production point for copper-base sheets is Carnegie A13.

BOLTS, NUTS

CARRIAGE, MACHINE BOLTS

(F.o.b. midwestern plants; per cent off list for less than case lots to consumers)

6 in. and shorter:
- ½-in. & smaller diam.. 27
- ⅝-in. & ⅞-in. 29
- ¾-in. and larger 26

Longer than 6 in.:
- All diams. 22

Lag bolts, all diams.:
- 6 in. and shorter 30
- over 6 in. long 28

Ribbed Necked Carriage. 26
Blank 40
Plow 40
Step, Elevator, Tap, and Sleigh Shoe 28
Tire bolts 20
Boiler & Fitting-Up bolts 37

NUTS

H.P. & C.P. Reg. & Heavy Square:	Reg.	Heavy
½-in. and smaller	25	
⅝-in. & ⅞-in.	23	
¾-in.-1½-in.	23	
1⅝ in. and larger.....	16	
H.P. Hex.:		
½-in. & smaller	33	29
⅝-in. & ⅞-in..	28	25
¾-in.-1½-in. ..	25	23
1⅝ in. & larger	17	16
C.P. Hex.:		
½-in. & smaller	33	29
⅝-in. & ⅞-in..	30	27
¾-in. & 1½ in.	27	24
1⅝ in. & larger	20	17

SEMIFINISHED NUTS

American Standard

(Per cent off list for less than case or keg quantities)

½-in. and smaller	Hvy.	Reg.	Lght.
....	35	41	41
⅝-in. & ⅞-in.	30	36	36
¾-in.-1½ in..	27	31	33
1⅝-in. & larger	17	21	..

STEEL STOVE BOLTS

(F.o.b. plant; per cent off list in packages)

Plain finish ..... 63.5 & 10
Plated finishes ... 50 & 10

HEXAGON CAP SCREWS

(1020 steel; packaged; per cent off list)

6 in. or shorter:
- ¼-in. through ⅝-in. .. 50
- ¾-in. through 1 in. .. 43

Longer than 6 in.:
- ¼-in. through ⅝-in... 33
- ¾-in. through 1 in... 13

SQUARE HEAD SET SCREWS

(Packaged; per cent off list)

1 in. diam. x 6 in. and shorter 46
1 in. and smaller diam. x over 6 in. 33

HEADLESS SET SCREWS

(Packaged; per cent off list)

No. 10 and smaller 41
¼-in. diam. & larger 24
N.F. thread, all diams. . 18

RIVETS

F.o.b. midwestern plants

Structural ½-in., larger 7.25c
⅞-in., under .....43 off

Washers, Wrought

F.o.b. shipping point, to jobbers .....Net to $1 off

ELECTRODES

(Threaded, with nipples, unboxed, f.o.b. plant)

GRAPHITE

Inches Diam.	Inches Length	Cents per lb
17,18,20	60,72	16.00
8 to 16	48,60,72	16.50
7	48,60	17.75
6	48,60	19.00
4, 5⅛	40	19.50
3	40	20.50
2½	24,30	21.00
2	24,30	23.00

CARBON

40	100,110	7.50
35	100,110	7.50
30	84,110	7.50
24	72 to 104	7.50
17 to 20	34,90	7.50
14	60,72	8.00
10,12	60	8.25

STAINLESS STEEL

(Cents per pound)

Type	Sheets	C.R. Strip	Bars Wire Structurals
301...	37.50	30.50	28.50
302...	37.50	33.00	28.50
303...	39.50	36.50	31.00
304...	39.50	35.00	30.00
309...	52.00	52.00	41.50
316...	53.00	55.00	46.00
321...	45.50	44.50	34.00
347...	50.00	48.50	38.50
410...	33.00	27.00	23.00
416...	33.50	33.50	23.50
420...	40.50	43.50	28.50
430...	35.50	27.50	23.50
501...	24.00	22.50	11.50
502...	25.00	23.50	12.50

Baltimore, Type 301 through 347 sheet, except 309 E2.
Baltimore, bars, wire and structurals A10.
Brackenridge, Pa., sheets A4
Bridgeville, Pa., bars, wire, sheets & strip, except Type 309 strip quoted 51.00c U4.
Butler, Pa., sheets and strip except Types 303, 309, 416, 420, 501 & 502 A10.
Carnegie, Pa., strip except Type 416; Type 309 strip quoted 51.00c S18.
Cleveland, strip, except Type 309 quoted 51.00c and except Type 416 A7.
Detroit, strip, except Type 309 M1.
Dunkirk, N.Y. bars, wire A4.
Duquesne, Pa., bars C3.
Fort Wayne, Ind., bars and wire, except Types 501 and 502 J6.
Gary, Ind., sheets except Type 416 C3.
Harrison, N. J., strip C18.
Harrison, N. J., Types 302, 304, 316 wire and strip D6.
Massillon, all products, except Type 309 bars, wire & structurals quoted 42.00c. Type 501, 10.50c, Type 502 11.50c R2.
McKeesport, Pa., bars; sheets except Type 416, C3.
McKeesport, Pa., bars & wire except Types 301, 309, 501 & 502; strip Types 410 & 430 only F2.
Middletown, O., sheets and strip, except Types 303, 416, 420, 501 and 502 A10.
Midland, sheets & strip C18.
Munhall, Pa., bars C3.
Pittsburgh, sheets C18.
Reading, Pa., bars & strip except Type 309 bars quoted 41.00c C4.
So. Chicago, Ill., bars & structurals C3.
Syracuse, N. Y., bars wire & structurals C18.
Titusville, Pa., bars U4.
Wallingford, Conn., strip, except 309, W2 quotes ¼-cent higher.
Washington, Pa., bars sheets & strip except Type 309 strip quoted 51.00c J3.
Washington, Pa., Types 301 through 347 sheets & strip as listed except 303 & 309; 316 sheets 58.00c, strip 60.00c W4.
Watervliet, N. Y., structurals & bars A4.
Waukegan, bars & wire A7.
West Leechburg, Pa., strip, except Type 300 quoted 51.00c A4.
Youngstown, strip C8.

COAL, CHEMICALS

Spot, cents per gallon, ovens
Pure benzol 25.00
Toluol, one deg. .18.25-25.75
Industrial xylol ..19.75-27.50
Per ton bulk, ovens
Sulphate of ammonia .$32-45
Cents per pound, ovens
Phenol, 40 (carlots, returnable drums) 13.50
Do., less than carlots..14.25
Do., tank cars 12.50

FLUORSPAR

Metallurgical grade, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content, 70% or more, $37; less than 60%, $34.
Imported, net ton, duty paid, metallurgical grade, $39-$40.

METAL POWDERS

(Per pound, f.ob. shipping point in ton lots for minus 100 mesh, except as otherwise noted.)

	Cents
Sponge Iron:	
98+% Fe, carlots .	15.00
Swedish, c.i.f. New York, in bags....	7.40-8.30
Electrolytic Iron:	
Annealed, 99.5% Fe	39.50
Unannealed, 99+% Fe	33.50
Unannealed 99+% Fe (minus 325 mesh)	48.50
Carbonyl Iron:	
97.9-99.8%, size 5 to 10 microns..70.00-135.00	
Aluminum:	
Carlots, freight allowed	27.00
Atomized, 500 lb drums, freight allowed	30.00
Brass, 10-ton lots.	27.25-29.25
Copper:	
Electrolytic 28.75-31.50	
Reduced	29.00
Lead	18.50
Manganese:	
Minus 100-mesh	52.00-55.00
Minus 35 mesh	48.00
Minus 200 mesh	56.00
Nickel unannealed ..	66.00
Nickel-Silver, 10-ton lots	36.25
Silicon	34.00-40.00
Solder (plus cost of metal)	8.50
Stainless Steel, 302...	75.00
Tin	90.50
Zinc, 10-ton lots.	18.00-25.50
	Dollars
Tungsten:	
99%, minus 80 to 200 mesh, freight allowed. over 1000 lb	2.90
1000 lb	2.95
less than 1000 lb..	3.00
98.8%, minus 65 mesh, freight allowed, 1000 lb and over..	2.90
less than 1000 lb..	3.00
Molybdenum:	
99%, minus 80 to 200 mesh, over 500 lb	2.25
200 to 500 lb	2.60
less than 200 lb..	2.75
82-88%, freight allowed. 2000 lb and over..	2.40
less than 2000 lb..	2.45
Chromium, electrolytic 99% Cr min.	3.50

METALLURGICAL COKE

Price per net ton

BEEHIVE OVENS

Connellsvil, fur. .$14.00-14.50
Connellsvil, fdry. .15.00-16.00
New River, foundry...19.00
Wise county, foundry..15.95
Wise county, furnace..15.20

OVEN FOUNDRY COKE

Kearney, N. J., ovens.$22.00
Everett, Mass., ovens
New England, del.‡ 23.40
Chicago, ovens 21.00
Chicago del. .....†22.45
Detroit, del. 24.91
Terre Haute, ovens....21.20
Milwaukee, ovens 21.75
Indianapolis, ovens 20.75
Chicago, del. 24.12
Cincinnati, del. 23.97
Detroit, del. 24.65
Ironton, O., ovens 20.40
Cincinnati, del. 22.71
Painesville, O., ovens..21.90
Buffalo, del. 24.02
Cleveland, del. 23.62
Erie, del. 22.06
Birmingham, ovens 19.15
Philadelphia, ovens ..21.25
Neville Island, Pa., ovens 21.00
Swedeland, Pa., ovens.21.20
Portsmouth, O., ovens..20.15
Cincinnati, del. 22.71
Detroit, ovens 21.65
Detroit, del. 22.65
Buffalo, del. 24.00
Flint, del. 24.09
Pontiac, del. 23.04
Saginaw, del. 24.40

Includes representative switching charge of: *, $1.05; †, $1.45, one-track charge being $1.20, two tracks $1.40, and three or more tracks $1.50. ‡ Or within $4.15 freight zone from works.

UNIVERSITY OF MICHIGAN LIBRARIES

WAREHOUSE STEEL PRODUCTS

(Prices, cents per pound, for delivery within switching limits, subject to extras)

	SHEETS			STRIP		BARS				PLATES	
	H.R. 18 Ga., Heavier*	C.R.	Galv. 10 Ga.†	H.R.*	C.R.*	H.R. Rds.	C.F. Rds.	H.R. Alloy 4140§	Standard Structural Shapes	Carbon	Floor
New York (city)	5.75	6.84	7.30	6.04	...	5.95	6.64	8.60	5.85	6.10	7.54
New York(c'try)	5.55	6.64	7.10	5.84	...	5.75	6.44	8.40	5.65	5.90	7.34
Boston (city) ..	5.95	6.75	7.22	5.90	...	5.80	6.39	8.70	5.95	6.28	7.48
Boston (c'try) .	5.75	6.55	7.02	5.70	...	5.60	6.19	8.50	5.75	6.08	7.28
Phila. (city) ..	6.45	6.60	7.00	5.90	...	5.75	6.46	8.40	5.50	5.70	6.80
Phila. (c'try)..	6.20	6.35	6.75	5.65	...	5.50	6.21	8.15	5.25	5.45	6.55
Balt. (city) ...	5.35	6.59	6.66	5.79	...	5.79	6.39	...	5.89	5.60	7.24
Balt. (c'try) ..	5.15	6.39	6.46	5.59	...	5.59	6.19	...	5.69	5.40	7.04
Norfolk, Va. ..	6.10	...	...	6.30	...	6.15	7.20	...	6.20	6.15	7.55
Wash. (w'hse).	5.56	6.80	6.73	6.00	...	6.00	6.62	...	6.10	5.81	7.45
Buffalo (del.)..	5.35	6.15	7.10	5.61	...	5.35	5.95	10.10††[5]	5.55	5.85	7.15
Buffalo (w'hse)	5.15	5.95	6.90	5.41	...	5.15	5.75	9.90††[5]	5.35	5.65	6.95
Pitts. (w'hse)..	5.05	5.80*	6.45-6.70	5.20	6.15	5.00	5.75	9.55††	5.05	5.15	6.40
Detroit (w'hse).	5.33	6.08*	7.09	5.49	...	5.39	5.91	9.86††[5]	5.64	5.79	6.88
Cleveland (del.)	5.35	6.15	7.20	5.44	6.35	5.32	5.95	8.31	5.57	5.72	6.92
Cleve. (w'hse).	5.15	5.95	7.00	5.24	6.15	5.12	5.75	8.16	5.37	5.52	6.72
Cincin. (city) ..	5.57	6.14	6.49	5.50	...	5.50	6.11	...	5.79	5.94	7.10
Chicago (city) .	5.35	6.15	6.95-7.00	5.30	...	5.30	5.85	9.75††[5]	5.45	5.60	6.80
Chicago (w'hse)	5.15	5.95	6.75-6.80	5.10	...	5.10	5.65	9.55††[5]	5.25	5.40	6.60
Milwaukee(city)	5.49	6.29	7.09	5.44	...	5.44	6.09	9.89††[5]	5.59	5.74	6.94
Milwau. (c'try).	5.29	6.09	6.89	5.24	...	5.24	5.89	9.69††[5]	5.39	5.54	6.74
St. Louis (del.).	5.68	6.48	7.28	5.63	...	5.63	6.28	10.08††[5]	5.78	5.93	7.13
St. L. (w'hse).	5.48	6.28	7.08	5.43	...	5.43	6.08	9.88††[5]	5.58	5.73	6.93
Kans. City(city)	5.95	6.75	7.60	5.90	...	5.90	6.55	...	6.05	6.20	7.60
KansCity(w'hse)	5.75	6.55	7.40	5.70	...	5.70	6.35	...	5.85	6.00	7.40
Omaha, Nebr. .	6.13‡	...	8.33	6.13	...	6.18	6.98	...	6.18	6.38	7.83
Birm'ham (del.)	5.20[10]	5.95	6.30[2]	5.25[10]	...	5.15[10]	6.88	...	5.20[10]	5.35[10]	7.63[10]
Birm'hm(w'hse)	5.05[10]	5.80	6.15[2]	5.10[10]	...	5.00[10]	...	...	5.05[10]	5.20[10]	...
Los Ang. (city)	6.00	7.50	7.03[2]	6.05	8.30	6.00	7.75	...	5.90	6.00	8.20
L. A. (w'hse)..	5.80	7.30	7.50[2]	5.85	8.10	5.80	7.55	...	5.70	5.80	8.00
San Francisco .	6.25[9]	7.60[2]	7.50[2]	6.75[9]	8.25[2]	6.15[9]	7.55	...	6.00[9]	6.15[9]	8.10[9]
Seattle-Tacoma.	6.60	8.15[2]	...	6.85	...	6.35	8.50	10.10	6.20	6.35[7]	8.40[7]

• Prices do not include gage extras; † prices include gage and coating extras, except Birmingham (coating extra excluded) and Los Angeles (gage extra excluded); ‡ includes extra for 10 gage; § as rolled; †† as annealed. Base quantities, 2000 to 9999 lb except as noted: Cold-rolled strip, 2000 lb and over; cold-finished bars, 2000 lb and over; [2]—500 to 1499 lb; [5]—450 to 1499 lb; [5]—1000 to 1999 lb; [7]—300 to 999 lb; [8]—300 to 499 lb; [9]—400 to 9999 lb; [10]—500 to 9999 lb inclusive.

REFRACTORIES

(Prices per 1000 bricks, f.o.b. plant)

FIRE CLAY BRICK

Super Duty: St. Louis, Vandalia, Farber, Mexico, Mo., Olive Hill, Ky., Clearfield, or Curwensville, Pa., Ottawa, Ill., $106. Hard-fired, $142 at above points.

High-Heat Duty: Salina, Pa. $91; Woodbridge N. J., St. Louis, Farber, Vandalia, Mexico, Mo., West Decatur, Orviston, Clearfield, Beach Creek, or Curwensville, Pa., Olive Hill, Hitchins, Haldeman, or Ashland, Ky., Troup, or Athens, Tex., Stevens Pottery, Ga., Portsmouth, or Oak Hill, O., Ottawa, Ill., $86.

Intermediate-Heat Duty: St. Louis, or Vandalia, Mo., West Decatur, Orviston, Beach Creek, or Clearfield, Pa., Olive Hill, Hitchins, or Haldeman, Ky., Athens, or Troup, Tex., Stevens Pottery, Ga., Portsmouth, O., Ottawa, Ill., $80.

Low-Heat Duty: Oak Hill, or Portsmouth, O., Clearfield, Orviston, Pa., Bessemer, Ala., $72; Ottawa, Ill., $70.

LADLE BRICK

Dry Press: Freeport, Merill Station, Clearfield, Pa., Irondale, Wellsville, O., Chester, W. Va., New Cumberland, W. Va., $60.

Wire Cut: Chester, W. Va., Wellsville, O., New Cumberland, W. Va., $58.

MALLEABLE BUNG BRICK

St. Louis, Mo., Olive Hill, Ky., $96; Ottawa, Ill., $90; Beach Creek, Pa., $86.

SILICA BRICK

Mt. Union, Claysburg, or Sproul, Pa., Portsmouth, O., Ensley, Ala., $86; Hays, Pa., $91; Joliet or Rockdale, Ill., E. Chicago, Ind., $95; Lehi, Utah, Los Angeles, $101.

Eastern Silica Coke Oven Shapes (net ton): Claysburg, Mt. Union, Sproul, Pa., Birmingham, $84.

Illinois Silica Coke Oven Shapes (net ton): Joliet or Rockdale, Ill., E. Chicago, Ind., Hays, Pa., $85.

BASIC BRICK

(Base prices per net ton; f.o.b. works, Baltimore or Chester, Pa.)

Burned chrome brick, $66; chemical-bonded chrome brick, $69; magnesite brick, $91; chemical-bonded magnesite, $80.

MAGNESITE

(Base prices per net ton, f.o.b. works, Chewelah, Wash.)

Domestic dead-burned, ⅜" grains; bulk, $33; single paper bags, $38.

DOLOMITE

(Base prices per net ton)

Domestic, dead-burned bulk; Billmeyer, Blue Bell, Williams, Plymouth Meeting, Pa., Millville, W. Va., Nario, Millersville, Martin, Gibsonburg, Woodville, O., $12.25; Thornton, McCook, Ill., $12.35; Dolly Siding, Bonne Terre, Mo., $12.45.

ORES

LAKE SUPERIOR IRON ORE

Gross ton, 51½% (natural), lower lake ports. After Jan. 25, 1950, increases or decreases, if any, in upper lake rail freight, dock handling charges and taxes thereon are for buyer's account.

Old range bessemer	$8.10
Old range nonbessemer	7.95
Mesabi bessemer	7.85
Mesabi nonbessemer	7.70
High phosphorus	7.70

EASTERN LOCAL ORE

Cents per unit, del E. Pa.

Foundry and basic 56.62% concentrates contract	16.00

FOREIGN ORE

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 60 to 68%:	
Spot	17.00
Long-term contract	15.00
North African hematites	15.75
Brazilian iron ore, 68-69%	18.00

TUNGSTEN ORE

Wolframite, scheelite, net ton unit, duty paid	$20-22

MANGANESE ORE

Long term contracts, nominal; nearby, 48%, duty paid, 79.8c-81.8c per long ton unit, c.i.f. U. S. ports; prices on lower grades adjusted to manganese content and impurities.

CHROME ORE

Gross ton, f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., or Tacoma, Wash.

Indian and African

48% 2.8:1	$32.50
48% 3:1	35.00-36.00
48% no ratio	26.00

South African Transvaal

44% no ratio	$17.00-18.00
45% no ratio	17.30-18.30
48% no ratio	26.00
50% no ratio	27.00-27.50

Brazilian

44% 2.5:1 lump	$32.00

Rhodesian

45% no ratio	$20.00-21.00
48% no ratio	26.00
48% 3:1 lump	35.00-36.00

Domestic—rail nearest seller

48% 3:1	$39.00

MOLYBDENUM

Sulphide concentrates per lb, molybdenum content, mines	$0.90

FERROALLOYS

MANGANESE ALLOYS

Spiegeleisen: (19-21% Mn, 1-3% Si), Carlot per gross ton, $65, Palmerton, Pa.; $66, Pittsburgh and Chicago; (16% to 19% Mn) $1 per ton lower.

Standard Ferromanganese: (Mn 78-82%, C 7% approx.) Carload, lump, bulk $172 per gross ton of alloy, cl., packed, $184; gross tons lots, packed, $199; less gross ton lot, packed, $216; f.o.b. Alloy, W. Va., Niagara Falls, N. Y., or Welland, Ont. Base price: $174, f.o.b. Birmingham and Johnstown, Pa., furnaces; $172, Sheridan, Pa.; $175, Etna, Pa. Shipment from Pacific Coast warehouses by one seller add $33 to above prices, f.o.b. Los Angeles, San Francisco, Portland, Oreg. Shipment from Chicago warehouse, ton lots, $214; less gross ton lots, $231 f.o.b. Chicago. Add or subtract $2.15 for each 1% or fraction thereof, of contained manganese over 82% and under 78%, respectively.

Low-Carbon Ferromanganese, Regular Grade: (Mn 80-85%). Carload, lump, bulk, max. 0.10% C, 24.75c per lb of contained Mn, carload packed 25.5c, ton lot 26.6c, less ton 27.8c. Delivered. Deduct 0.5c for max. 0.15% C grade from above prices, 1c for max. 0.30% C, 1.5c for max. 0.50% C, and 4.5c for max. 75% C—max. 7% Si. **Special Grade:** (Mn 90% approx., C 0.07% max., P 0.06% max.). Add 0.5c to above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.5% max., Si 1.5% max.). Carload, lump, bulk 18.15c per lb of contained Mn, carload packed 18.9c, ton lot 20.0c, less ton 21.2c. Delivered. Spot, add 0.25c.

Manganese Metal, 2" x D (Mn 96% min., Fe 2% max., Si 1% max., C 0.2% max.): Carload lump bulk, 29c per lb of metal; packed, 35.5c; ton lot 31.25c, less ton lot 33.25c. Delivered. Spot, add 2c.

Manganese Electrolytic: Less than 250 lb, 35c; 250 lb to 1999 lb, 32c; 2000 to 39,999 lb, 30c; 40,000 lb or more, 28c. Premium for hydrogen-removed metal 1.5c per pound, f.o.b. cars Knoxville, Tenn. Freight allowed to St. Louis or to any point east of Mississippi.

Silicomanganese: (Mn 65-68%). Contract, lump, bulk, 1.50% C grade, 18-20% Si, 8.95c per lb of alloy, carload packed, 9.70c, ton lot 10.60c, less ton 11.60c. Freight allowed. For 2% C grade, Si 15-17%, deduct 0.2c from above prices. Spot, add 0.25c.

CHROMIUM ALOYS

High-Carbon Ferrochrome: Contract, c.l., lump, bulk, 20.5c per lb of contained Cr. c.l., packed 21.4c, ton lot 22.55c, less ton 23.95c. Delivered: Spot, add 0.25c.

"SM" High-Carbon Ferrochrome: (Cr 60-65%, Si 4-6%, Mn 4-6%, C 4-6%). Add 1.1c to high-carbon ferrochrome prices.

(*Please turn to page* 170)

Nickel Price Advances to 48.00c

Boost of 8 cents a pound, first in nearly two years, results from major increases in production and processing costs. Corresponding increases made in prices for nickel products

New York—Nickel has joined the lengthening list of metals which have moved to higher price levels. The movement has gained momentum steadily since early in the year and has shown no sign of having run its course.

The price of nickel is 48.00c a pound, effective as of May 31, an advance of 8 cents a pound above the level which had held for nearly two years. The new base price quoted by the International Nickel Co. Inc. in the United States for electrolytic nickel is at Port Colborne refinery in Ontario, Canada, and includes the United States import duty.

This is the first change in the price of nickel since July 22, 1948, when it was raised 5 cents a pound to the 40-cent figure that prevailed until now.

The company says that the current increase results from major cost increases in nickel production and processing. It says the price is about 40 per cent above the average price prevailing for all markets in the prewar years and compares with gains of 65 per cent to 125 per cent for other base metals.

The price of 40.00c for nickel prevailed for many years prior to 1921. Before the last war, the average price for all markets was 35.00c.

The parent Canadian company, International Nickel Co. of Canada Ltd., simultaneously announced a like advance of 8 cents a pound for refined nickel in Canada and the United Kingdom, thereby maintaining the policy of offering its nickel in world markets at uniform prices in terms of United States dollars.

Nickel oxide sinter and other forms of nickel, including rolling mill products, will be offered at corresponding increased prices.

"It is now apparent that major increases in costs of refined nickel require that the price be lifted to 48.00c a pound, U. S. currency," Dr. John F. Thompson, president of the International Nickel Co. of Canada Ltd., said in commenting on the new prices. "As a result of the round after round of heavy increases since before the war in the rates we pay for labor and for supplies and services, the advances in the nickel price, including the present increase, are necessary to compensate for our cost increases."

Copper Demand Is Heavy

New York—Inquiry for copper for June and July delivery is still active, imparting a strong price tone to the market. Supplies of metal for delivery this month are virtually nonexistent while those for July delivery are being allocated carefully by producers.

Demand is stimulated by the threat of a tariff on copper after June 30. Congressional action to continue the suspension of the tariff would have a moderating influence on the market, C. Donald Dallas, chairman, Revere Copper & Brass Inc., this city, says. Government stockpiling, now estimated at an annual rate of about 190,000 tons compared with 175,000 for 1949, also is exerting a strong pressure on prices.

Shipments of ingot brass and bronze during April totaled 22,118 tons compared with 22,494 tons shipped in March and 10,695 tons in April, 1949, reports the Ingot Brass & Bronze Industry.

Zinc Advances to 13.00c

New York—Undertone of the zinc market continues strong at the 13-cent level which was posted May 29. The ½-cent advance on that day made the total advance 3.25 cents since Mar. 14 and lifted the market to the highest level since Apr. 27, 1949.

Actual bookings at the new level are comparatively light, however, due to continuing limited supplies.

Mills have advanced their prices to the basis of 18.75c per pound for sheets, 18.00c for ribbon zinc, 17.00c for plates under 12 in., and 18.00c for plates over 12 in.

STEEL'S Metal Price Averages for May, 1950

(Cents per pound)

Electrolytic Copper, del. Conn.	
Lead, St. Louis	11.521
Prime, Western Zinc, E. St. Louis	11.990
Straits Tin, New York	77.500
Primary Aluminum Ingots, del.	17.192
Antimony, f.o.b. Laredo, Tex.	24.500
Nickel, f.o.b. refinery	40.308
Silver, New York	72.635

Leases Magnesium Properties

Las Vegas, Nev.—Contracts with Combined Metals Reduction Co., Salt Lake City, Utah, and National Lead Co., New York, for leases and purchase options on units of the basic magnesium plant at Henderson, Nev., have been signed by Robert B. Bradford of the General Services Administration, Washington.

Combined Metals Reduction expects to take over leased units as soon as plans for its refinery are completed. National Lead has contracted to lease two units at the basic magnesium plant with about 10 acres and 90 million kw of power per year with option to purchase. The company's titanium division has asked the Colorado River Commission for two additional units contingent upon provision of another 90 million kw of power yearly.

Construction of a large plant for production of titanium may be started by National Lead in the fall of 1951 with operations slated as soon as enough power is available in 1952.

Combined Metals Reduction plans to build a refinery for production of manganese, lead, zinc and lead from concentrates turned out by a concentrating plant to be built at Pioche, Nev. This unit will treat oxidized ores developed in the company's Pioche mines. The basic magnesium plant and facilities are owned by the state of Nevada.

Lead Prices Hold Steady

New York—Despite the short work-week, a fair tonnage of lead was booked last week on the basis of 11.80c, St. Louis.

Consumption is holding at a high rate, although a somewhat smaller tonnage is being used by the battery industry. For the first time since May, 1949, shipments of automotive replacement batteries in April dropped below the 1 million mark, totaling 917,000 units compared with 1,191,000 units in March. Shipments were still substantially above those of a year ago, when April shipments totaled only 499,000. At the annual meeting of battery manufacturers earlier this month, it was estimated that total shipments for 1950 may reach 21 million units. This would require average monthly shipments of about 2 million units for the final nine months.

Tin Market in Doldrums

New York—Trading in the tin market continues unusually quiet. Prices are fairly steady at around 78.00c for prompt delivery of Straits.

Aluminum Extrusion Prices Rise

Pittsburgh — Aluminum Co. of America advances prices on extrusions, effective June 2, as follows: On extruded shapes, rods and bars, ½-cent on alloys 3S, 14S and 61S; 1 cent on alloys 24S and 75S. No change was made on alloy 63.

Bauxite Output Increases

Washington — Mine production of bauxite in the United States increased to 325,025 long tons (dried equivalent) in the first quarter of 1950 from 323,266 tons in the preceding quarter and 317,738 tons in the like quarter a year ago, reports the Bureau of Mines. It was the largest output reported since the fourth quarter of 1948 when 373,608 tons were produced. A six per cent gain in imports to 628,318 tons brought total new supply to 953,343 tons, the highest level since the fourth quarter of 1948.

Brass Ingot Output Holds

Washington—Production of brass ingot in February held steady on an average daily basis, although the total for the month eased to 20,920 tons from 24,066 tons in January, reports the Bureau of Mines. The February decline in production of composition ingot, amounting to 1589 tons, was of the same order as the January increase but that of leaded semired brass was 1088 tons compared with a 32-ton decrease in January. Other February changes were less than 300 tons each.

UNIVERSITY OF MICHIGAN LIBRARIES

NONFERROUS METALS

(Cents per pound, carlots, except as otherwise noted)

Primary Metals

Copper: Electrolytic 20.50c, Conn. Valley; Lake 20.62½c, Conn. Valley.

Brass Ingot: 85-5-5-5 (No. 115) 19.00-19.25c; 88-10-2 (No. 215) 26.25c; 80-10-10 (No. 305) 22.75c; No. 1 yellow (No. 405) 16.25-17.00c.

Zinc: Prime western 13.00c; brass special 13.25c, intermediate 13.50c, East St. Louis; high grade 14.10c, delivered.

Lead: Common 11.80c; chemical 11.90c; corroding 11.90c, St. Louis.

Primary Aluminum: 99% plus, ingots 17.50c, pigs 16.50c. Base prices for 10,000 lb and over. Freight allowed on 500 lb or more, but not in excess of rate applicable on 30,000 lb c.l. orders.

Secondary Aluinum: Piston alloys 17.75c; No. 12 foundry alloy (No. 2 grade) 17.00-17.25c; steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 18.00-18.25c; grade 2, 17.50-17.75c, grade 3, 16.25-16.50c; grade 4, 15.75-16.00c. Prices include freight at carload rate up to 75 cents per 100 lb.

Magnesium: Commercially pure (99.8%) standard ingots, 10,000 lb and over, 20.50c, f.o.b. Freeport, Tex.

Tin: Grade A, prompt del., 78.00c; June del. 78.00c; July del 77.875c; Aug. del. 77.75c.

Antimony: American 99-99.8% and over but not meeting specifications below 24.50c; 99.8% and over (arsenic 0.05% max.; other impurities 0.1% max.) 25.00c; f.o.b. Laredo, Tex., for bulk shipments. Foreign, 99%: Chinese and Yugoslavian, 22.00c; English and Belgian, prompt, 23.00c, New York.

Nickel: Electrolytic cathodes, 99.9%, base sizes at refinery, unpacked, 48.00c; 25-lb pigs, 50.50c; "XX" nickel shot, 51.50c; "F" nickel shot or ingots, for addition to cast iron, 48.50c. Prices include import duty.

Mercury: Open market, spot, New York $70-$73 per 76-lb flask.

Beryllium-Copper: 3.75-4.25% Be, $24.50 per lb contained Be.

Cadmium: "Regular" straight or flat forms, $2 del.; special or patented shapes, $2.15.

Cobalt: 97-99%, $1.80 per lb for 550 lb (keg); $1.80 per lb for 100 lb (case); $1.87 per lb under 100 lb.

Gold: U. S. Treasury, $35 per ounce.

Silver: Open market, New York, 72.75c per oz.

Platinum: $66-$69 per ounce.

Palladium: $24 per troy ounce.

Iridium: $100 per troy ounce.

Titanium (sponge form): $5 per pound.

Rolled, Drawn, Extruded Products

COPPER AND BRASS

(Base prices, cents per pound, f.o.b. mill; based on 20.50-cent copper.)

Sheet: Copper 35.43; yellow brass 32.03; commercial bronze, 95%, 35.36; 90%, 34.88; red brass, 85% 33.89; 80%, 33.42; best quality, 32.90; nickel silver, 18%, 45.21; phosphor-bronze, grade A, 5% 53.17.

Rods: Copper, hot-rolled 31.28; cold-drawn 32.53; yellow brass free cutting, 26.43; commercial bronze, 95% 35.05; 90% 34.57; red brass 85% 33.58; 80% 33.11.

Seamless Tubing: Copper 35.47; yellow brass 35.04; commercial bronze 90% 37.54; red brass 85% 36.80; 80% 36.33.

Wire: Yellow brass 32.32; commercial bronze, 95% 35.65; 90% 35.17; red brass, 85% 34.18; 80% 33.71; best quality brass 33.19.

Copper Wire: Bare, soft, f.o.b. eastern mills, c.l. 24.67, l.c.l. 25.17, 100,000 lb lots 24.545; weatherproof, f.o.b. eastern mills, c.l. 26.60, l.c.l. 27.10, 100,000 lb lots 26.35; magnet, del., 15,000 lb or more 30.50, l.c.l. 31.25.

ALUMINUM

(30,000 lb base; freight allowed on 500 lb or more, but not in excess of rate applicable on 30,000 lb c.l. orders.)

Sheets and Circles: 2S and 3S mill finish c.l.

Thickness Range, Inches	Widths or Diameters, In., Incl.	Flat Sheet Base*	Coiled Sheet Base	Coiled Sheet Circle† Base
0.249-0.136	12-48	27.4	...	...
0.135-0.096	12-48	27.9	...	...
0.095-0.077	12-48	28.4	26.5	30.1
0.076-0.061	12-48	29.0	26.7	30.3
0.060-0.048	12-48	29.2	26.9	30.6
0.047-0.038	12-48	29.6	27.1	30.9
0.037-0.030	12-48	30.0	27.5	31.4
0.029-0.024	12-48	30.4	27.8	31.8
0.023-0.019	12-36	31.0	28.2	32.3
0.018-0.017	12-36	31.6	28.8	33.1
0.016-0.015	12-36	32.3	29.4	34.0
0.014	12-24	33.2	30.2	35.1
0.013-0.012	12-24	34.1	30.9	36.0
0.011	12-24	35.1	31.8	37.2
0.010-0.0095	12-24	36.1	32.8	38.5
0.009-0.0085	12-24	37.3	33.9	40.0
0.008-0.0075	12-24	38.6	35.1	41.6
0.007	12-18	40.0	36.4	43.4
0.006	12-18	41.5	37.7	47.5

* Minimum length, 60 inches. † Maximum diameter, 24 inches.

Screw Machine Stock: 5000 lb and over.

Diam. (in.) or distance across flats	—Round— R317-T4, 17S-T4	R317-T4	——Hexagonal—— 17S-T4
0.125	48.5	....	....
0.156-0.203	41.5	....	....
0.219-0.313	38.5	....	....
0.344	37.5	....	47.5
0.375	37.0	46.0	44.5
0.406	37.0	....	....
0.438	37.0	46.0	44.5
0.469	37.0	....	....
0.500	37.0	46.0	44.5
0.531	37.0	....	....
0.563	37.0	....	42.0
0.594	37.0	....	....
0.625	37.0	43.5	42.0
0.656	37.0	....	....
0.688	37.0	....	42.0
0.750-1.000	36.0	41.0	39.5
1.063	36.0	....	38.0
1.125-1.500	35.0	39.5	38.0
1.563	35.0	....	37.0
1.625	34.0	....	37.0
1.688-2.000	34.0	....	....
2.125-2.500	33.0	....	....
2.625-3.375	32.0	....	....

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh) Sheets: Full rolls, 140 sq ft or more, $17.00 per cwt; add 50c cwt, 10 sq ft to 140 sq ft. Pipe: Full coils, $17.00 per cwt. Traps and bends: List price plus 45%.

ZINC

Sheets, 18.75c f.o.b. mill, 36,000 lb and over. Ribbon zinc in coils, 18.00c, f.o.b. mill, 36,000 lb and over. Plates, not over 12-in., 17.00c; over 12-in., 18.00c.

NICKEL

(Base prices f.o.b. mill)

Sheets, cold-rolled, 69.00c. Strip, cold-rolled, 75.00c. Rods and shapes, 65.00c. Plates, 67.00c. Seamless tubes, 98.00c.

MONEL

(Base prices, f.o.b. mill)

Sheets, cold-rolled 53.00c. Strip, cold-rolled, 56.00c. Rods and shapes, 51.00c. Plates, 52.00c. Seamless tubes, 86.00c. Shot and blocks, 46.00c.

MAGNESIUM

Extruded Rounds, 12 in. long, 1.312 in. in diameter, less than 25 lb. 52.00-56.00c; 25 to 99 lb. 42.00-46.00c; 100 lb to 4000 lb, 35.00-36.00c.

Plating Materials

Chromic Acid: 99.9% flake, f.o.b. Philadelphia, carloads, 25.50c; 5 tons and over 26.00c; 1 to 5 tons, 26.50c; less than 1 ton 27.00c.

Copper Anodes: Base 2000 to 5000 lb; f.o.b. shipping point, freight allowed; Flat untrimmed 32.09c; oval 31.59; cast 30.12c.

Copper Cyanide: 70-71% Cu, 100-lb drums, 1000 lb 46.50c, under 1000 lb 48.50c f.o.b. Niagara Falls, N. Y.

Sodium Cyanide: 96-98%, ½-oz ball, in 200 lb drums, 1 to 900 lb, 18.00c; 1000 to 19,000 lb, 17.00c, f.o.b. Niagara Falls, N. Y. Packaged in 100 lb drums add ½-cent.

Copper Carbonate: 54-56% metallic Cu; 50 lb bags, up to 250 lb, 26.25c; over 250 lb, 25.25c, f.o.b. Cleveland.

Nickel Anodes: Rolled oval, carbonized, carloads, 56.00c; 10,000 to 30,000 lb, 57.00c; 3000 to 10,000 lb, 58.00c; 500 to 3000 lb, 59.00c; 100 to 500 lb, 61.00c; under 100 lb, 64.00c; f.o.b. Cleveland.

Nickel Chloride: 100-lb kegs, 26.50c; 400-lb bbl. 24.50c, f.o.b. Cleveland, freight allowed on barrels, or 4 or more kegs.

Tin Anodes: Bar, 1000 lb and over 94.00c, 500 to 999 lb, 94.5c; 200 to 499 lb, 95.00c; less than 200 lb, 96.5c, ball, 1000 lb and over, 96.25c; 500 to 999 lb, 96.75c; 200 to 499 lb 97.25c; less than 200 lb, 98.75c, f.o.b. Sewaren, N. J.

Sodium Stannate: 25 lb cans only, less than 100 lb, to consumers 59.7c, 100 or 300 lb drums only, 100 to 500 lb, 51.4c; 600 to 1900 lb, 49c; 2000 to 9900 lb, 47.3c, f.o.b. Sewaren, N. J. Freight not exceeding St. Louis rate allowed.

Zinc Cyanide: 100 lb drums, less than 10 drums 42.00c, 10 or more drums 40.00c, f.o.b. Niagara Falls, N. Y.; 43.25c and 41.25c, respectively, del. Cleveland or Philadelphia.

Stannous Sulphate: 100 lb kegs or 400 lb bbl, less than 2000 lb 85.70; more than 2000 lb, 83.70c, f.o.b. Carteret, N. J.

Stannous Chloride (Anhydrous): In 400 lb bbl, 72.29c; 100 lb kegs 73.29c, f.o.b. Carteret, N. J.

Scrap Metals

BRASS MILL ALLOWANCES

Prices in cents per pound for less than 15,000 lb, f.o.b. shipping point.

	Heavy Clean	Ends Rod	Turnings Clean
Copper	17.50	17.50	16.75
Yellow Brass	14.625	14.375	13.375
Commercial Bronze			
95%	16.50	16.25	15.75
90%	16.375	16.125	15.625
Red brass			
85%	16.00	15.75	15.25
80%	15.75	15.50	15.00
Best Quality(71-80%)	15.375	15.125	14.625
Muntz metal	13.50	13.25	12.75
Nickel, silver, 10%	16.375	16.125	8.18¾
Phos. bronze, A	17.75	17.50	16.50
Naval brass	13.875	13.625	13.125
Manganese bronze	13.875	13.625	13.00

BRASS INGOT MAKERS' BUYING PRICES

(Cents per pound, delivered eastern refineries, carload lots)

No. 1 copper 17.25; No. 2 copper 16.25; light copper 15.25; composition red brass 14.50-14.75; radiators 11.25-11.50; heavy yellow brass 11.00-11.25.

REFINERS' BUYING PRICES

(Cents per pound, delivered refinery, carload lots)

No. 1 copper 17.25; No. 2 copper 16.25; light copper 15.25; refinery brass (60% copper) per dry copper content 16.00-16.25.

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots)

Copper and brass: Heavy copper and wire, No. 1 15.75-16.00; No. 2 14.75-15.00; light copper 13.75-14.00; No. 1 composition red brass 12.75-13.00; No. 1 composition turnings 12.25-12.50; mixed brass turnings 8.00-8.25; new brass clippings 12.50-13.00; No. 1 brass rod turnings 11.00-11.50; light brass 7.75-8.00; heavy yellow brass 8.75-9.00; new brass rod ends, 11.25-11.75; auto radiators, unsweated 9.75-11.00; cocks and faucets, 10.75-11.00; brass pipe 11.25-11.50.

Lead: Heavy 9.50-9.75; battery plates 5.25-5.50; linotype and stereotype 11.50-11.75; electrotype 9.75-10.00; mixed babbitt 9.75-10.00.

Zinc: Old zinc 6.50-6.75; new die cast scrap 6.50-6.75; old die cast scrap 4.75-5.00.

Tin: No. 1 pewter 39.00-41.00; block tin pipe 60.00-62.00; No. 1 babbitt 30.00-32.00.

Aluminum: Clippings 2S 11.00-11.50; old sheets 8.00-8.50; crankcase 8.00-8.50; borings and turnings 5.00.

DAILY PRICE RECORD

1950	Copper	Lead	Zinc	Tin	Aluminum	Antimony	Nickel	Silver
June 1	20.50	11.80	13.00	78.00	17.50	24.50	48.00	72.75
May Avg.	19.962	11.521	11.990	77.500	17.192	24.50	40.308	72.635
May 31	20.50	11.80	13.00	78.00	17.50	24.50	48.00	72.75
May 29	20.50	11.80	13.00	78.125	17.50	24.50	40.00	72.75
May 26-27	20.50	11.80	12.50	78.00	17.50	24.50	40.00	72.75
May 25	20.50	11.80	12.50	78.25	17.50	24.50	40.00	72.75
May 24	20.50	11.80	12.50	78.50	17.50	24.50	40.00	72.75
May 23	20.50	11.80	12.00	78.375	17.50	24.50	40.00	72.75
May 22	20.50	11.80	12.00	78.25	17.50	24.50	40.00	72.75
May 19-20	20.50	11.80	12.00	77.50	17.50	24.50	40.00	72.75
May 18	20.50	11.80	12.00	77.375	17.00	24.50	40.00	72.75
May 17	20.50	11.80	12.00	77.50	17.00	24.50	40.00	72.75
May 15-16	19.50	11.80	12.00	77.375	17.00	24.50	40.00	72.75
May 11-13	19.50	11.80	12.00	77.625	17.00	24.50	40.00	72.75

NOTE: Copper: Electrolytic, del. Conn. Valley; Lead, common grade, del. E. St. Louis; Zinc, prime western, del. St. Louis; Tin, Straits, del. New York; Aluminum primary ingots, 99%, del.; Antimony, bulk, f.o.b. Laredo, Tex.; Nickel, electrolytic cathodes, 99.9%, base sizes at refinery unpacked; Silver, open market, New York. Prices, cents per pound; except silver, cents per ounce.

IRON AND STEEL SCRAP

Consumer prices, except as otherwise noted, including brokers' commissions, as reported to STEEL, June 1, 1950; gross tons except as noted.
Changes shown in italics.

STEELMAKING SCRAP COMPOSITE

June 1	$37.17
May 25	35.50
May 1950	33.82
June 1949	20.85
June 1945	19.07

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

PITTSBURGH

No. 1 Heavy Melt.	*$42.00-43.00*
No. 2 Heavy Melt.	*37.00-38.00*
No. 1 Busheling	*42.00-43.00*
No. 1 Bundles	*42.00-43.00*
No. 2 Bundles	*35.00-36.00*
Heavy Turnings	*36.00-37.00*
Machine Shop Turnings	*30.00-31.00†*
Mixed Borings, Turnings	*30.00-31.00†*
Short Shovel Turnings	*33.50-34.50*
Cast Iron Borings	*29.50-30.50*
Low Phos. Steel	*43.50-44.50*

Cast Iron Grades

No. 1 Cupola Cast	37.00-38.00
No. 1 Machinery Cast	41.00-42.00
Charging Box Cast	37.00-38.00
Heavy Breakable Cast	33.50-34.50

Railroad Scrap*

No. 1 R.R. Heavy Melt.	40.00-40.50‡
Rails, Random Lengths	40.00-41.00
Rails, 2 ft. and under	42.50-43.00
Rails, 18 in. and under	44.00-44.50
Railroad Specialties	43.00-44.00
Axles	38.00-39.00
Angles, Splice Bars	41.00-42.00*

* Nominal.
† Crushers' buying prices.
‡ Brokers' buying prices.

CLEVELAND

No. 1 Heavy Melt. Steel	*$42.50-43.00*
No. 2 Heavy Melt. Steel	*37.50-38.00*
No. 1 Busheling	*42.50-43.00*
No. 1 Bundles	*42.50-43.00*
No. 2 Bundles	*31.50-32.00*
Machine Shop Turnings	*27.00-27.50*
Mixed Borings, Turnings	*29.50-30.00*
Short Shovel Turnings	*29.50-30.00*
Cast Iron Borings	*29.50-30.00*
Low Phos.	*43.50-44.00*

Cast Iron Grades

No. 1 Cupola	*49.00-50.00*
Charging Box Cast	*45.00-46.00*
Stove Plate	*44.00-45.00*
Heavy Breakable Cast	*40.00-42.00*
Unstripped Motor Blocks	*35.00-36.00*
Brake Shoes	*37.00-38.00*
Clean Auto Cast	*49.00-50.00*
No. 1 Wheels	*45.00-46.00*
Burnt Cast	*39.00-40.00*

Railroad Scrap

No. 1 R.R. Heavy Melt.	*42.50-43.00*
R.R. Malleable	*49.00-50.00*
Rails, 3 ft and under	*50.00-51.00*
Rails, 18 in. and under	*51.00-52.00*
Rails, Random Lengths	*49.00-50.00*
Cast Steel	*42.50-43.00*
Railroad Specialties	*43.50-44.00*
Uncut Tires	*49.00-50.00*
Angles, Splice Bars	*51.00-51.50*

VALLEY

No. 1 Heavy Melt. Steel	*$44.50-45.00*
No. 2 Heavy Melt. Steel	*39.50-40.00*
No. 1 Bundles	*44.50-45.00*
No. 2 Bundles	*33.50-34.00*
Machine Shop Turnings	*29.00-29.50*
Short Shovel Turnings	*31.50-32.00*
Cast Iron Borings	*31.50-32.00*
Low Phos.	*45.50-46.00*

Railroad Scrap

No. 1 R.R. Heavy Melt.	*44.50-45.00*

PHILADELPHIA

No. 1 Heavy Melt. Steel	$32.50
No. 2 Heavy Melt. Steel	*30.50*
No. 1 Busheling	31.00
No. 1 Bundles	32.50
No. 2 Bundles	27.00
Machine Shop Turnings	*23.00*
Short Shovel Turnings	*25.50*
Mixed Borings, Turnings	*22.00*
Low Phos. Punchings and Plate, elec. fur. grade	*37.00*
Low Phos. Plate, 5 ft & Under	*37.00*
Elec. Furnace Bundles	33.50
Heavy Turnings	32.50
No. 1 Chemical Borings	30.00
Knuckles and couplers	37.00
Steel car wheels	37.00

Cast Iron Grades

No. 1 Cupola Cast	34.00-35.00
No. 1 Machinery Cast	39.00-40.00
No. 1 Yard Cast	34.00-35.00
Charging Box Cast	*36.00-37.00*
Heavy Breakable Cast	*36.00-37.00*
Unstripped Motor Blocks	29.00
Clean Auto Cast	39.00-40.00
No. 1 Wheels	*41.00-42.00*
Malleable	*45.00-46.00*

CINCINNATI

No. 1 Heavy Melt. Steel	*$35.00*
No. 2 Heavy Melt. Steel	*31.00*
No. 1 Busheling	*35.00*
No. 1 Bundles	*35.00*
No. 2 Black Bundles	*30.00*
No. 3 Bundles	*25.00*
Machine Shop Turnings	*21.00*
Short Shovel Turnings	*24.00*
Mixed Borings, Turnings	*23.00*
Cast Iron Borings	*24.00*

Cast Iron Grades

No. 1 Cupola Cast	*46.50*
Charging Box Cast	*37.00*
Stove Plate	33.00
Heavy Breakable Cast	*40.00*
Unstripped Motor Blocks	27.00
Brake Shoes	26.00
Clean Auto Cast	*46.50*
Drop Broken Cast	*48.00*

Railroad Scrap

No. 1 R.R. Heavy Melt.	*37.00*
R.R. Malleable	*43.00*
Rails, Rerolling	45.00
Rails, Random Lengths	*42.00*
Rails, 18 in. and under	*50.00*

DETROIT

(Brokers' buying prices, f.o.b. shipping point)

No. 2 Heavy Melt. Steel	*$29.00-30.00*
No. 1 Bundles	*41.00-42.00*
No. 2 Bundles	*27.50-28.00*
No. 1 Busheling	*40.50-41.00*
Machine Shop Turnings	*24.50-25.00*
Forge Flashings	*40.50-41.00*
Short Shovel Turnings	*26.50-27.00*
Cast Iron Borings	*26.50-27.00*
Punchings & Plate Scrap	*40.50-41.00*

Cast Iron Grades

No. 1 Cupola Cast	38.00-39.00
Heavy Breakable Cast	33.00-34.00
Clean Auto Cast	43.00-44.00

BUFFALO

No. 1 Heavy Melt. Steel	*$36.50-37.00*
No. 2 Heavy Melt. Steel	*33.50-34.00*
No. 1 Busheling	*33.50-34.00*
No. 1 Bundles	*35.50-36.00*
No. 2 Bundles	*32.50-33.00*
Machine Shop Turnings	*28.50-29.00*
Mixed Borings, Turnings	*28.50-29.00*
Cast Iron Borings	*28.50-29.00*
Short Shovelings	*30.50-31.00*
Low Phos.	*38.50-39.00*

Cast Iron Grades

No. 1 Machinery	*40.00-40.50*
No. 1 Cupola	*38.50-39.00*
Stove Plate	*38.00-39.00*
Malleable	34.50-35.00

Railroad Scrap

Rails, 2 ft. and under	*43.50-44.00*
Scrap rails	*40.00-40.50*
Specialties	*42.50-43.00*

NEW YORK

(Brokers' buying prices f.o.b. shipping point)

No. 1 Heavy Melt. Steel	*$31.00-31.50*
No. 2 Heavy Melt. Steel	*25.50-26.00*
No. 1 Busheling	*28.00-28.50*
No. 1 Bundles	*31.00-31.50*
No. 2 Bundles	*24.50*
Machine Shop Turnings	*18.50-19.00*
Mixed Borings, Turnings	*18.50-19.00*
Short Shovel Turnings	*20.50-21.00*
Punchings & Plate Scrap	*32.00-34.00*
Low Phos. Plate, 5 ft & under	*32.00-34.00*
Elec. Furnace Bundles	29.00-29.50

Cast Iron Grades

No. 1 Cupola Cast	*29.00-30.00*
No. 1 Machinery	*30.00-31.00*
Charging Box Cast	*30.00-31.50*
Heavy Breakable	*30.00-31.50*
Unstripped Motor Blocks	*23.00-23.50*
Malleable	*36.50*

BOSTON

(F.o.b. shipping point)

No. 1 Heavy Melt. Steel	*$30.00-31.00*
No. 2 Heavy Melt. Steel	*23.50-24.50*
No. 1 Bundles	*30.00-31.00*
No. 1 Busheling	*29.00-30.00*
Machine Shop Turnings	*17.00-18.00*
Mixed Borings, Turnings	*17.00-18.00*
Short Shovel Turnings	*19.00-20.00*
Bar Crops and Plate	28.00-29.00
Punchings & Plate Scrap	28.00-29.00
Chemical Borings	19.50-20.00

Cast Iron Grades

No. 1 Cupola Cast	30.00-32.00
Mixed Cast	28.00-29.00
Heavy Breakable Cast	26.50-27.50
Stove Plate	*26.00-27.00*

CHICAGO

No. 1 Heavy Melt. Steel	*$36.00-37.00*
No. 2 Heavy Melt. Steel	*34.00-35.00*
No. 1 Bundles	*36.00-37.00*
No. 2 Bundles	31.00
Machine Shop Turnings	23.00-24.00
Mixed Borings, Turnings	23.00-24.00
Short Shovel Turnings	*27.00-28.00*
Cast Iron Borings	*27.00-28.00*
Low Phos.	*40.00-41.00*
Elec. Furnace Bundles	*36.00-37.00*
Heavy Turnings	*30.00-31.00*
Cut Structurals	*37.00-38.00*

Cast Iron Grades

No. 1 Cupola Cast	*47.00-50.00*
Clean Auto Cast	*49.00-50.00*
No. 1 Wheels	38.00-39.00
Stove Plate	*38.00-39.00*

Railroad Scrap

No. 1 R.R. Heavy Melt.	*39.00*
Malleable	44.00-45.00
Rails, Rerolling	*52.00-53.00*
Rails, Random Lengths	*43.00-44.00*
Rails, 2 ft and under	*47.00-48.00*
Rails, 18 in. and under	*48.00-49.00*
Railroad Specialties	*40.00-41.00*
Angles, Splice Bars	*43.50-44.50*

BIRMINGHAM

No. 1 Heavy Melt. Steel	$26.00
No. 2 Heavy Melt. Steel	24.00
No. 1 Busheling	25.00
No. 2 Bundles	22.00
Machine Shop Turnings	19.50
Mixed Borings, Turnings	17.00
Short Shovel Turnings	23.00
Cast Iron Borings	19.00
Bar Crops and Plate	28.00-29.00
Cut Structurals	28.00-29.00

Cast Iron Grades

No. 1 Cupola Cast	35.00-36.00
Stove Plate	30.00-31.00
No. 1 Wheels	30.50-31.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	27.00-28.00
R.R. Malleable	nominal
Rails, Rerolling	33.00-35.00
Rails, 3 ft and under	36.00
Angles and Splice Bars	35.00-36.00

ST. LOUIS

No. 1 Heavy Melt. Steel	$34.00-35.00
No. 2 Heavy Melt. Steel	31.00-32.00
Machine Shop Turnings	*22.00-24.00*
Short Shovel Turnings	*26.00-28.00*

Cast Iron Grades

No. 1 Cupola Cast	39.00-41.00
Charging Box Cast	34.00-35.00
Heavy Breakable Cast	33.00-34.00
Brake Shoes	34.00-35.00
Clean Auto Cast	39.00-41.00
Burnt Cast	33.00-34.00

Railroad Scrap

R.R. Malleable	36.00-37.00
Rails, Rerolling	*50.00-52.00*
Rails, Random Lengths	*39.00-40.00*
Rails, 3 ft and under	42.00-43.00
Uncut Tires	*38.00-39.00*
Angles, Splice Bars	39.00-41.00
Railroad Specialties	*41.00-42.00*

SAN FRANCISCO

No. 1 Heavy Melt. Steel	$20.00
No. 2 Heavy Melt. Steel	18.00
Nos. 1 & 2 Bundles	16.00
No. 3 Bundles	13.00
Machine Shop Turnings	9.00

Cast Iron Grades

No. 1 Cupola Cast	30.00-35.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	20.00
Rails, Random Lengths	20.00

SEATTLE

No. 1 Heavy Melt. Steel	$18.00
No. 2 Heavy Melt. Steel	18.00
No. 1 Busheling	15.50
Nos. 1 & 2 Bundles	16.00
No. 3 Bundles	12.00
Machine Shop Turnings	13.00
Mixed Borings, Turnings	13.00
Punchings & Plate Scrap	27.50-30.00
Cut Structurals	27.50-30.00

Cast Iron Grades

No. 1 Cupola Cast	25.00-30.00
Heavy Breakable Cast	25.00
Stove Plate	25.00
Unstripped Motor Blocks	23.00
Malleable	25.00
Brake Shoes	23.00
Clean Auto Cast	25.00-30.00
No. 1 Wheels	25.00-30.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	19.00
Railroad Malleable	25.00
Rails, Random Lengths	19.00
Angles and Splice Bars	19.00

LOS ANGELES

(F.o.b. car, Los Angeles)

No. 1 Heavy Melt. Steel	$20.00
No. 2 Heavy Melt. Steel	18.00
Nos. 1 & 2 Bundles	16.00
No. 3 Bundles	*13.00*
Machine Shop Turnings	5.00
Mixed Borings, Turnings	5.00
Punchings & Plate Scrap	*30.00*

Cast Iron Grades

No. 1 Cupola Cast	*38.00-39.00*

Railroad Scrap

No. 1 R.R. Heavy Melt.	20.00
Rails, Rerolling	30.00

HAMILTON, ONT.

(Delivered prices)

Heavy Melt.	$27.00
No. 1 Bundles	27.00
Mechanical Bundles	25.00
Mixed Steel Scrap	23.00
Mixed Borings, Turnings	20.00
Rails, Remelting	27.00
Rails, Rerolling	30.00
Busheling	21.50
Bushelings new factory, prep'd	25.00
Bushelings new factory, unprep'd	20.00
Short Steel Turnings	20.00

Cast Iron Grades

Cast	40.00-43.00*

* F.o.b. shipping point.

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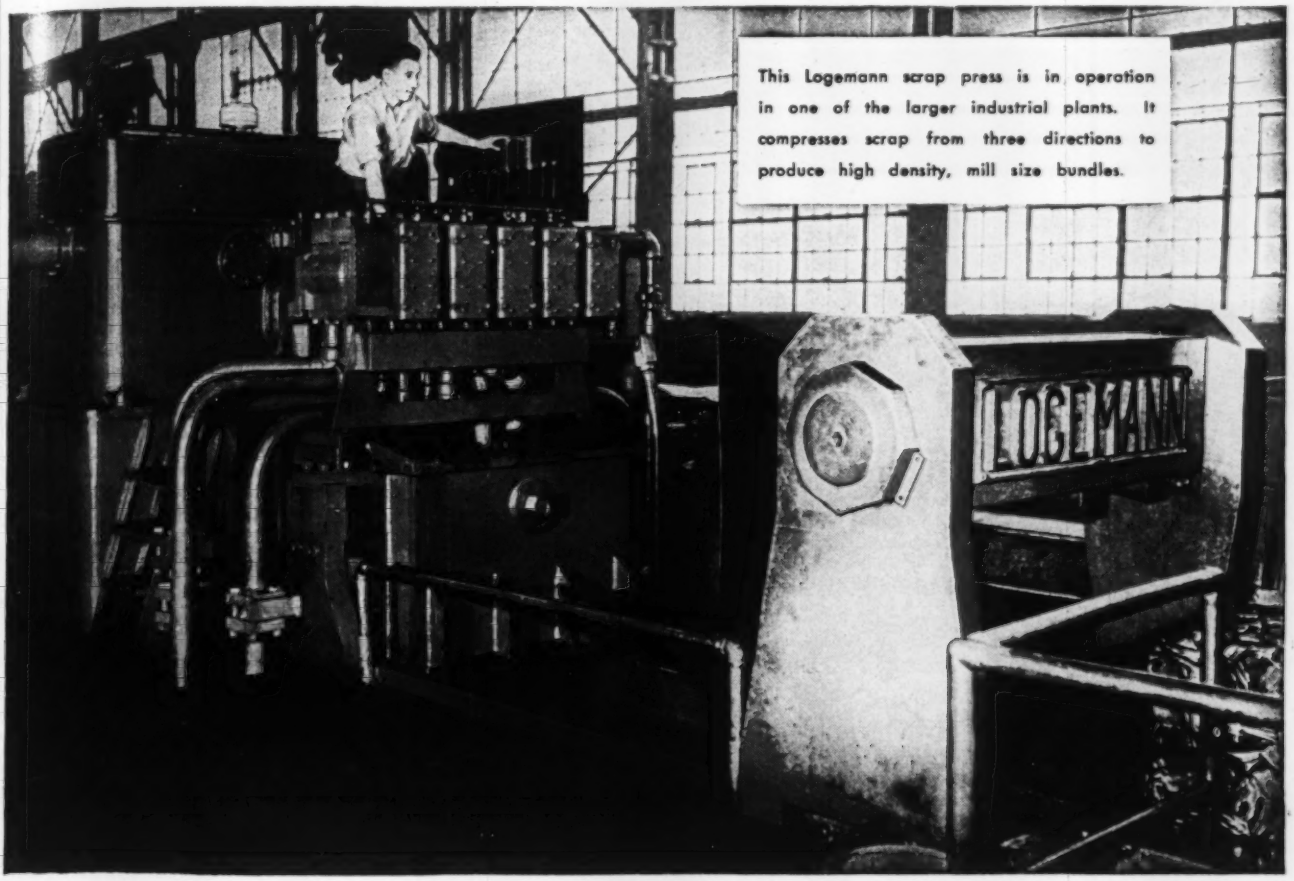

This Logemann scrap press is in operation in one of the larger industrial plants. It compresses scrap from three directions to produce high density, mill size bundles.

Self-contained.....
Triple Compression..
Automatically Controlled

LOGEMANN SCRAP PRESSES

handle high tonnages with minimum labor . . . at low cost!

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Logemann Bros. Co. have specialized in the production of scrap metal presses for sheet mills, stamping plants, scrap yards, and metal manufacturing plants of all types for nearly 75 years. Write for full information—please state the nature of your scrap and tonnage.

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In ACCO *Registered* SLING CHAINS, you have a selection of types, sizes and materials to best meet the needs of any application—plus the assurance that every sling that carries the Identification Ring has been fully tested and rigidly inspected.

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TRADE MARK

In Business for Your Safety

Sheets Strip . . .

Sheet and Strip Prices, Page 151 & 152

Cleveland — Sheet shortages are hampering manufacturing but no plant shutdowns for lack of supplies are noted. Outlook for supply improvement is unpromising. Producers are sold out for third quarter. Much of that period's output will go for the carryover from second quarter. Large carryover, consequently, is expected from third to fourth quarter.

Consumers are turning to the premium markets for relief. Conversion sheets are offered for fourth quarter at double standard market prices.

Price advances by nonintegrated sheetmakers have aroused speculation as to price policy of the larger makers over coming months. Soaring scrap prices are thought bound to exert tremendous upward pressure on entire finished steel price structure.

Republic Steel Corp. has effected minor changes in its extra card on hot-rolled carbon strip. Extras for cutting to length were revised slightly; file steel quality extra was cut from $1.55 to 90 cents; extra of 10 cents per cwt was established on restrictive mechanical test requirements and on decarburization limit measurement.

New York — Stringency in sheets likely will become tighter. There is little prospect of any softening in demand soon. Indications point to a let-up in production this summer because of vacations and necessity for making equipment repairs.

Most producers believe they will have all the business they can handle this year; at least one leading interest is prophesying an active first half 1951.

Items in stringent supply include hot and cold-rolled sheets, enameling stock, electrical and galvanized sheets. Even on some of the specialties, such as stainless sheets and strip, producers are sold up for weeks ahead. One producer can accept nothing now for shipment under 20 weeks and this situation is spreading insofar as stainless strip is concerned. Some can still accept business in stainless sheets for August delivery.

Boston—Pressure for flat-rolled products is increasing, demand broadening. New orders are heavy with fourth quarter delivery schedules filling. Many consumers are seeking to place orders for two and three times their usual tonnage. More volume is sought from Pittsburgh and other distant points. Hot-rolled strip deliveries extend to October on practically all widths. Stainless is available for August-September shipment.

Pittsburgh — Nonintegrated hand mill sheet producers have increased prices because of steady rise in sheet bar quotations, in turn attributed to 100 per cent increase in steel scrap prices since last August. No change is noted in conversion charge for customers furnishing semifinished. One interest reports some sheet bar suppliers will no longer make a firm price commitment, instead quoting a price subject to change in direct relationship with fluctuation in scrap price. Thus prices for sheets from hand mill operators vary considerably based on range of sheet bar quotations. Most hand mill interests are

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booked into October and later, in some instances, on galvanized. Producers of stainless strip are booked into late August. Sheet deliveries are not quite so extended.

Philadelphia—No early easing in the stringency in sheets is expected. While producers are endeavoring to allocate tonnage to keep schedules in line, some admit that they have more tonnage on books for third quarter than they can handle. Seasonal influences in their relation to automobiles and certain household appliances should ease pressure somewhat in fourth quarter.

Chicago—Scattered price advances have come to producers' notice in this district but there are no indications the increases will be generally followed. Although pressure for steel continues to mount, producers are not discounting possibility of a rapid about-face in demand. Some users are believed to be overstating their needs.

Expectation of some producers that demands of farm implement makers would diminish has not been realized. Freight car builders are mentioned as requiring much more steel than present allotments provide. Some of these had sizable inventories when the freight car ordering sag occurred last year.

Presently there is no let-up in total demand. Sheet makers, however, doubt that the fervor will last through the year. With automaking holding the key, they think contraction in builders' production rates is almost certain in fourth quarter.

Cincinnati—Inquiries for conversion contracts are increasing. Pressure for mill tonnages continues without letup.

Birmingham—Pressure is unabated for all specifications in sheets and, to lesser extent, strip. Mills may have to tighten up allocations. The district's largest producer continues to better its production record, but remains behind current demand.

St. Louis—Sheet demand is increasing steadily. Mills are sold out through September, with requests coming in for fourth-quarter allotments on cold-rolled sheets. Fourth-quarter books may be opened as early as mid-July in an effort to apportion quotas fairly.

Los Angeles—Fabricators say inventories of flat-rolled are in worse shape than at any time the past year. Deliveries of sheet and strip are coming in haltingly. Columbia Steel Co. is booked through August on sheet and Kaiser Steel Corp. has placed cold-rolled strip on allocation.

San Francisco—Sheet supplies are tighter than ever with demand increasing.

Tin Plate . . .

Tin Plate Prices, Page 152

Pittsburgh—Sellers anticipate full tin plate production schedules through most of the year with electrolytic output exceeding hot-dipped. The gap between the two may narrow during the peak of the food packing season. Extremely heavy demand for tin plate in the case of one producer caused that maker to withdraw temporarily from the market on other finished steel products.

The UTILITRUC 10,000-lb FORK-LIFT TRUCK

Clark's NEW Heavyweight CHAMPION with DYNA-TORK Drive

Clark announces the Utilitruc-100—a 10,000-pound-capacity gasoline-powered fork-lift truck added to its steadily-growing line of materials-handling machines and attachments.

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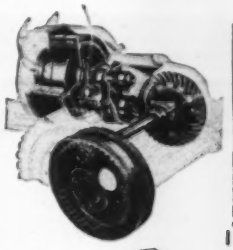

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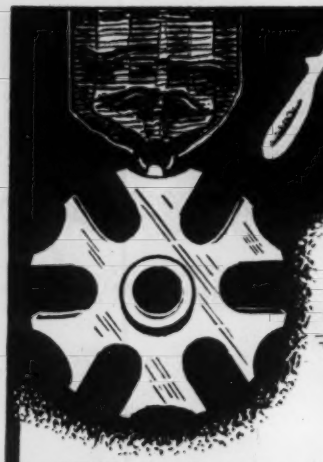

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A low carbon, free machining, open hearth hot rolled steel plate. Desirable carburizing qualities. 70,000 p.s.i. tensile strength and other equally advantageous properties. Smooth finishes easily obtained. Widely used for molds, gears, sprockets, fixtures, steam plates, etc.

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Tubular Goods . . .

Tubular Goods Prices, Page 154

Pittsburgh—Pressure for pipe deliveries increases. There is some evidence a large portion of conversion steel tonnage is financed by petroleum interests, although not to the extent during 1947-48. Order backlogs for transmission line pipe extend into 1954. Jobbers' stocks of standard pipe are unbalanced and inadequate. Recent upturn in zinc prices brings up the question whether producers will again relate the price of galvanized pipe to fluctuations in zinc. This action is thought improbable because of pricing confusion that results among jobber accounts. However, this does not outlaw possibility of periodic price adjustments in event upward trend in zinc continues.

Los Angeles—Pipe supply is reaching the critical stage. Kaiser Steel Corp. pipe is on allocation, and deliveries from eastern mills are being extended. Kaiser's bookings destined for the east total $100 million. Latest order is for $35 million from the Trunkline Gas Supply Co.; calls for 255,000 tons of steel pipe for the Texas to Illinois natural gas line.

Seattle—Inquiry for cast iron pipe is fair, other types offering keen competition. No important projects are up for immediate action.

Steel Bars . . .

Bar Prices, Page 151

Pittsburgh—Production of carbon and alloy, hot and cold-finished bars throughout third quarter is expected to continue at near record pace. Output is seen limited only by the amount of semifinished steel made available to hot mills and stocks of hot-rolled bars held by cold finishers. One producer has temporarily withdrawn from the bar market due to heavy demand for tin plate, its primary product. Pressure for deliveries is increasing. Indicated production schedules among automotive, petroleum, machine tools, electrical appliance and farm implement industries should sustain current bar output through remainder of the year. Carryover tonnage and vacation shutdowns will cut into July mill allotments.

Boston—Demand for carbon bars is centered heavily in small sizes with deliveries extended to October. Orders are heavier from cold-finishing units, bolt and nut makers, and forge shops. Alloy bars are not sharing in the strong demand noted for carbon grades.

Philadelphia—While hot carbon bar tonnage is available for August, some producers are out entirely for that month and one, booked far ahead, is refusing to make further promises whatsoever. A strong diversified demand is being extended to cold drawn bars. Some warehouses say they are having difficulty keeping a balanced stock in cold drawn bars. Tool steels are in easy supply.

Cleveland—Merchant bar sellers offer little promise of supply easing before fourth quarter. Pickup in bar demand has been marked over recent weeks and most mills now are virtually sold out for third quarter. Shortage of semifinished steel is an increasing factor in the pinch in bars.

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Cold-finishers are having a tough time filling their hot bar needs. Delivery promises now extend into September with demand still strong. Noticeable pickup in demand for cold-finished from Chrysler parts suppliers has developed since they were unable to stock much tonnage during the Chrysler strike.

Chicago — Carryovers into third quarter are not as sizable as for flat-rolled but producers are unable to make noticeable dents in the tonnage. Imbalance of inventories prevents carrying out consumers' production schedules and some big sheet users admit bar items are imposing stumbling blocks to manufacturing. Some substitution of alloy for carbon is adding to tightening the position of the former.

San Francisco—Steel bars are plentiful. Demand is not too active.

Plates . . .

Plate Prices, Page 151

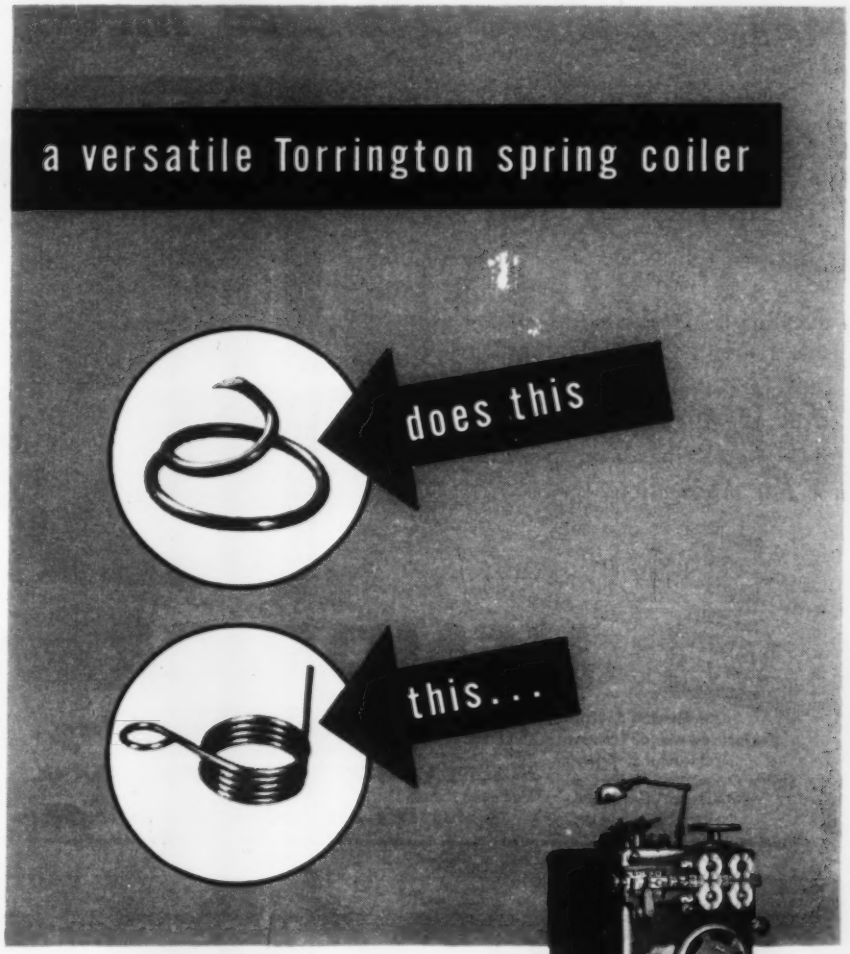
New York—Pressure for light gage plates continues. Producers having capacity for third quarter are those unwilling to accept all tonnage offered. There may be some openings later as seasonal demand subsides for light underground fuel tanks, but producers are confident they will have no difficulty in obtaining all the tonnage they desire. Shipping promises on heavy gage plates are steadily becoming more extended. Certain mills can promise nothing on new orders before August. Suspensions for mass vacation periods are going to interfere with production this summer. At least one producer will suffer further disruptions while making major repairs to blooming mill pits.

Pittsburgh — Growing tightness in plate supply may prevent some freight carbuilders meeting assembly schedules on recent bookings. Dravo Corp. received award from Union Barge Line Corp. for 10 covered barges involving 2200 tons and 10 hopper barges representing 1600 tons of steel. Same company will replace bottoms and sides of 10 deck barges of the U. S. Army Corps of Engineers, involving 500 tons of steel. Transmission pipe line commitments continue major outlet for plates. Distribution will remain on allocation basis throughout third quarter.

Philadelphia—Little plate tonnage is available here against new orders before August. One eastern mill is out of the market entirely until September. A leading Pittsburgh mill is out for entire third quarter. Some eastern mills are out for virtually the entire quarter on light gages, and are turning down more tonnage than they are booking. One mill now will accept light gage tonnage only to the extent of 25 per cent of a given order. Central Iron & Steel Co., Harrisburg, Pa., advanced carbon plates $7 a ton, 3.85c, mill, effective June 1.

Birmingham—Plate orders continue to be offered. Demand from regular sources remains strong. Against the overall need, local carbuilders are attempting to accumulate stocks to meet needs which will continue heavy through December, possibly longer.

Seattle—Important plate tonnages are pending for government power



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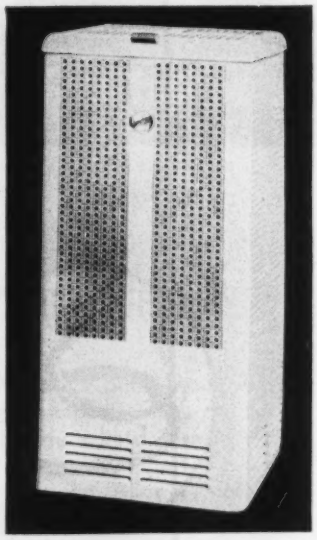

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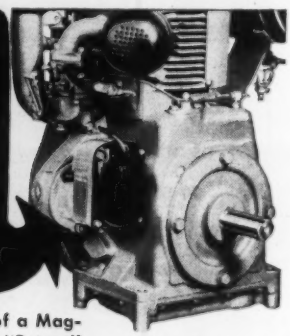

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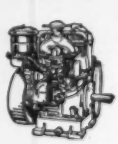

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World's Largest Builders of Heavy-Duty Air-Cooled Engines

MILWAUKEE 14, WISCONSIN

projects in Oregon and Washington. Plate shops have a fair volume of small contracts for tanks and pipe.

Wire . . .

Wire Prices, Page 153

Philadelphia—Nails, particularly 8 to 12 penny, and plaster board nails, are in tight supply. Spring wire and galvanized wire, on the other hand, are in relatively easy supply; also fencing and fence posts.

Birmingham — Demand for most wire products is steady. Inquiry for nails has felt the general effect of slowed construction because of the plumbers' strike.

Structural Shapes . . .

Structural Shape Prices, Page 151

New York — Eastern structural shops report further backlog increase and anticipate additional gains. Public work, particularly bridges is outstanding. There is a good sprinkling of apartments and small commercial buildings. Improvement is noted in industrial construction but the peak in this field is thought passed for this year.

Philadelphia—While structural activity centers chiefly about bridgework, there is an increasing amount of miscellaneous construction. This may serve to relieve the strong competitive situation among fabricating shops. The largest private job placed recently in this district is a 3100-ton apartment at Eighteenth street and Walnut, this city. One shape producer is quoting eight to 10 weeks delivery; another 12 weeks.

Cleveland—Numerous small building jobs being figured in this area assure active demand for structurals and other building steel over the summer. Apartment work is fairly heavy and there is some industrial construction projected. In the main, however, bulk of current demand is for public projects. Shape deliveries from the mills are becoming increasingly extended. Little additional tonnage can be placed for third quarter. However, most structural fabricators' needs are covered for the period. Price shading on fabricated work continues, but it is less severe than a month or two back.

Birmingham — Generally confused picture in construction here due to the plumbers' strike is causing slackening in demand for shapes. Considerable work is in prospect, however, for comparatively early start.

Los Angeles—Producers of standard shapes report little difficulty in keeping deliveries ahead of the moderate improvement in demand. Standard structural shapes are available from Kaiser Steel Corp. or Columbia Steel Co. within 8 weeks. Delivery of wide-flanged structurals from the East, now averaging 12 weeks, is becoming increasingly extended.

San Francisco—Buying is spotty, with principal demand from public works. Structurals are in fair supply except sizes shipped from the east.

Seattle—Fabricators report a substantial number of small jobs, less than 100 tons each, for private construction projects.

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Reinforcing Bars . . .

Reinforcing Bar Prices, Page 151

Los Angeles—Fabricators of small jobs—schools and miscellaneous industrials—report backlogs higher than last year. In a recent 10-day period, a major fabricator booked only one job of over 100 tons—the average around 8 tons. Fabricators are holding stocks down to 30 days' supply.

Seattle—Rolling mill operations are steady. Large number of small tonnages of reinforcing for miscellaneous projects is pending.

Pig Iron . . .

Pig Iron Prices, Page 150

Pittsburgh—Improvement in foundry activity is restricted to large captive shops producing for enamelware and radiation, electrical appliances and heavy machinery. Production schedules of jobbing shops are well sustained at three to four days weekly. Outlook is brighter for increased demand from freight car builders. Vacation shutdowns should ease the anticipated pig iron shortage developing out of the furnace relining program of the lone merchant producer here.

New York—Despite only fair foundry operations, pig iron supply tightens. Some suppliers are confronted with more than average demands from other districts, particularly the Middle West. Shipments so far are proving adequate. Nevertheless, some consumers are showing more interest in foreign offerings because of the possibility of severe stringency later on as well as lower prices compared with the domestic market.

Philadelphia — Foreign iron, at around $8 to $9 under the domestic market, is gaining wider acceptance along the seaboard. Recent purchases include some round tonnages of basic. Domestic sellers claim they are able to dispose of all the iron they can produce. Purchases of imported iron are stimulated by the soaring market in scrap, and growing tightness in domestic pig iron supply. Meanwhile, general casting demand is taking a turn for the better.

Cleveland — Pig iron supplies are tightening. Stepping up in operations by both light and heavy foundries has brought a corresponding increase in pig iron specifications. Producers are shipping every pound of metal produced, but the foundries are not able to materially enlarge their inventories. Some midwestern foundries are reaching into the East for supplies. Summer vacation shutdowns are expected to permit some iron accumulations, but consensus in this market is that pig iron will be in fairly tight supply over the remainder of the year. Special irons are moving in large volume. One Ohio producer of silveries, although operating at capacity, has more orders on books than it can satisfy until well into summer.

Buffalo—Sustained improvement in demand for merchant pig iron is readily absorbing current production. This is reflected in the fact a number of barges with consignments for the east coast are forced to carry

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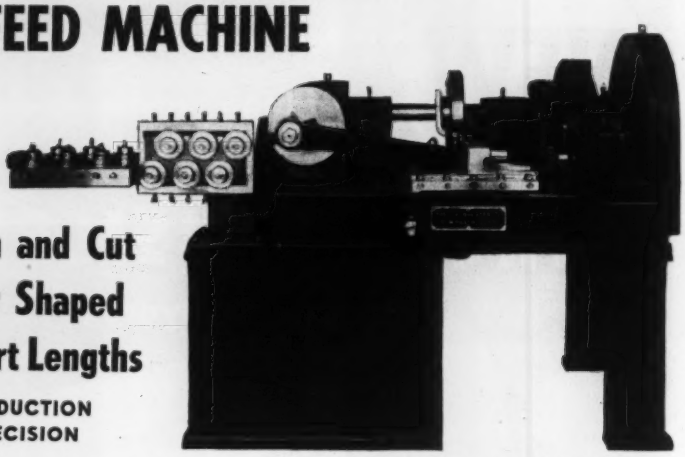

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water ballast because available iron stocks are insufficent to assure required draft.

Cincinnati—Better foundry schedules are bringing an increase in demand for iron.

Chicago—With foundries generally working five days a week melt is in many cases restricted to availability of iron. Sharp rises in cast scrap prices have made pig iron more desirable and foreign iron is being used by some shops, premiums being paid.

Birmingham—Pig iron demand is gaining slightly, although the strike of plumbers and steamfitters has had a decidedly adverse effect on construction.

St. Louis—Pressure for pig iron continues strong. Foundry demand is increasing.

Seattle—Foundry operations have increased in line with rising seasonal demands. Cast iron scrap is plentiful at $25 to $30 which is below levels at other Pacific Coast centers. Consumers are using foreign pig iron.

Iron Ore . . .

Iron Ore Prices, Page 155

Cleveland — Ore shippers have made no headway in reducing the season's stock deficit due to the late opening of navigation because of bad ice conditions in the upper lakes. For the week ended May 29, shipments totaled 2,615,039 tons compared with 2,584,195 tons in the like week a year ago. This brought the cumulative total for the season to only 8,826,454 tons compared with 19,745,774 tons for the like 1949 period. Shipments to United States ports alone totaled 8,592,586 tons, drop of 10,937,374 tons from the corresponding period last year.

Metallurgical Coke . . .

Metallurgical Coke Prices, Page 154

Pittsburgh—Furnace coke demand is well sustained at high levels, reflecting pressure to increase pig iron output so as to lessen dependency on scrap. Modernization program at Clairton Works of U. S. Steel Corp., initiated two years ago, has taken another step toward completion with award of two new batteries of 87 underjet coke ovens each to Koppers Co. Inc. These batteries will replace similar number of old ovens, and will carbonize 5000 tons of coal every 24 hours, yielding about 3300 tons of coke in same period.

Cleveland—With foundry operations rising demand for coke is so heavy producers serving this area are finding it necessary to ration supplies. Vacation shutdowns will permit the foundries to accumulate some supplies, but tight supply conditions are expected to prevail pretty much through remainder of the year. Betterment in castings demand is reflected at both light and heavy foundries.

Chicago—Lack of sufficient coke is given by some blast furnace operators as the reason for not using all furnaces. Four in the district are out of blast. Foundry coke is in restricted supply, some shops complaining they have more trouble obtaining fuel than iron.

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Scrap . . .

Scrap Prices, Page 158

Pittsburgh—Scrap prices broke into new high ground last week to 100 per cent above the low point last year, registered in August. The end is not in sight. Mills have paid up to $45 on No. 1 heavy melting from remote areas involving large freight charges. Local open hearth scrap grades are quoted within a range of $42 to $43, an advance of $3 to $4. Considerable tonnage of short turnings has been purchased at $34.50, increase of $4.50 from last preceding quotation. Award of No. 1 heavy melting on the latest New York Central list is reported at $48 and specialties within the range of $50 to $51. Since none of this scrap came to this district railroad list quotations here remain nominally unchanged. The leading producer is negotiating for a large tonnage of German scrap.

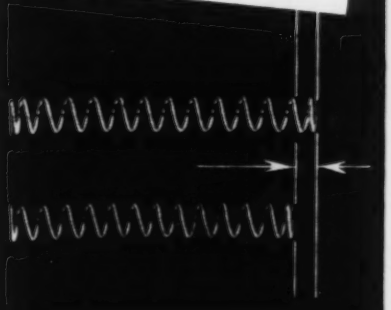
Cleveland—Scrap prices are sharply higher here on the basis of a small tonnage purchase by a local mill and brokers' buying prices. No. 1 heavy melting steel is quoted $42.50-$43. Besides being part of the general inflation, the advance is indirectly the result of earmarking. Brokers who had made large commitments to mills suddenly found that scrap from important sources could no longer be applied against these contracts since it had been earmarked for return to particular mills. With scrap selling at high levels, mills find it prudent to use more pig iron in their melts, thus cutting down production of iron used by foundries. The latter, in turn, must enter the scrap market more agressively. Buying of scrap for conversion deals also is an important factor in the price advance. The supply position varies among mills, some having ample stocks while others have less than 30 days' requirements. Collections have been stimulated by the high prices. No. 1 railroad heavy melting steel is quoted $42.50-$43, although the railroads have received as much as $47.50-$48.

New York—Scrap brokers' buying prices continue to soar under pressure of heavy consumer demand. No. 1 heavy melting steel and No. 1 bundles are now $31-$31.50, f.o.b. shipping point; No. 2 heavy melting, $25.50-$26; No. 1 busheling, $28-$28.50; No. 2 bundles, $24.50. Machine shop turnings and mixed borings and turnings have been advanced to $18.50-$19, short shovel turnings, to $20.50-$21. Punchings and plate scrap and low phos plate have been boosted sharply to $32-$34.

While somewhat less buoyant than prices for the steel grades, cast scrap prices are generally higher. Brokers are now offering to pay $29-$30 for No. 1 cupola cast; $30-$31 for No. 1 machinery; $30-$31.50 for charging box and heavy breakable. They have boosted offerings on unstripped motor blocks to $23-$23.50; on malleable to $36.50.

Philadelphia—Much strength underlies the scrap market. There has been no further important consumer buying of heavy melting steel but brokers and dealers are paying as much for a considerable portion of the tonnage they will need in covering on recent contracts as they will

"FOR SPRINGS THAT STAY LIVELY LONGER!"



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AMBLER, PENNA.

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receive. Competition of Pittsburgh and midwestern mills for tonnage is raising havoc with the new price structure. One eastern consumer is expecting a cargo of foreign scrap within the next week and has three other cargoes loading on the other side. Further orders for foreign scrap are being placed. Some foreign scrap has been placed around $29.50-$30.50, f.o.b. eastern ports.

For the moment No. 1 heavy melting steel and No. 1 bundles are nominally unchanged at $32.50. It appears highly probable new consumer purchases will go at higher levels, in view of the experience sellers are having covering old contracts. No. 2 heavy melting is slightly higher at $30.50. Borings and turnings and low phos scrap prices are higher. Several cast grades are also higher. Due to an error in transmission, malleable was quoted in the May 29 issue at $33-$34 when the range should have been $43-$44.

Chicago—Left holding the bag with sizable mill orders at prices about $2 under the present market, many brokers are at complete loss as to the causes for the runaway price situation. Mills, it is believed, could not obtain No. 1 steel at less than $37. Many brokers are paying within 50 cents of that price to obtain material to cover outstanding orders and are unable to get sizable tonnages. On the basis of a mill purchase of railroad heavy melting at $39, No. 1 scrap is scheduled for further advances. No. 2 bundles did not follow the uptrend last week and are moving readily at $31. The upshooting price structure applies to almost all grades and individual sales of cupola cast, involving 500 tons, have been made at $50. Railroad list which closed last Thursday brought bids from brokers in excess of $39 gross ton, delivered, indicating that this market has not stabilized.

Detroit—The "crazy" scrap market lunged forward again in the face of serious shortage of material resulting from most automotive production scrap being earmarked. The latter tonnages, incidentally, bring the highest quoted price. No. 1 bundles are up $4.50 per ton, while other grades rae higher by $2.50-$3.00.

Buffalo—Scrap prices have advanced $2 a ton here on the basis of sales to mills outside this district. Buying interest here continues light despite activity in other markets. No. 1 heavy melting is now quoted $36.50-$37. Cast scrap is $2 a ton higher on a sale of No. 1 machinery at $40-$40.50.

Cincinnati—Scrap prices are considerably higher for June mill commitments. Bidding on railroad lists is a current indication of the strong undertone. Sales to foundries, although spotty, are in better volume.

St. Louis—Railroad scrap prices are higher with most items up $1 to $2. Rail grades have shown unusual strength for several weeks due to demands of the casting trade.

Los Angeles—Surging foundry activity has created heavy demand for cast scrap and No. 1 cupola cast is now $38-39, up $2.

San Francisco—Prices are unchanged on steelmaking grades. Mills are buying fairly liberally.

Seattle—Mill buyers report ample steel scrap supplies. Prices for No. 1 and No. 2 heavy melting are steady at $18.

Warehouse . . .

Warehouse Prices, Page 155

Pittsburgh—Distributors' daily average shipments during May scored a slight improvement over April tonnage and were at least 10 to 15 per cent above the like 1949 month. Unbalanced and nearly depleted inventory situation among sheet and strip items has spread to plates and structurals.

Philadelphia—District warehouses are again revising their prices on galvanized sheets as a result of still higher prices for zinc. Demand generally continues active, although some leading sellers assert May business was off slightly from the April rate.

Cleveland—Warehouses are entertaining a rising volume of orders. In the words of one large distributor, "demand is terrific." Nevertheless, except for the flat-rolled items and hot rolled bars, the stores are keeping pretty well up with demand.

Cincinnati—Active demand for warehouse steel is steadily cutting into inventories, mill replacements being inadequate. Number of inquiries, especially in flat-rolled, is up and old methods of spreading available material are in use.

Chicago—Warehouses report sales for May were lower than for a year ago, reason being lack of steel to sell. Prices on galvanized sheets in the district vary.

Birmingham—Warehouse demand for steel is exceptionally strong. General price increases on most items have been announced.

Los Angeles—Warehouse prices are strong. Distributors say they have leaned too far in the direction of mill prices, especially in smaller quantity brackets. Demand continues heavy.

Seattle—Warehouses report a good volume of business after a slow start in March and April. Turnover is better than normal. Due to scarcity of hot and cold-rolled sheets large buyers are turning to the warehouses for emergency supplies.

Rails, Cars . . .

Track Material Prices, Page 153

New York—Equitable Life Assurance Society has extended its purchase-lease railroad freight car plan to include diesel locomotives. Thomas I. Parkinson, president, says several railroads and diesel locomotive manufacturers have expressed interest and contracts are being discussed.

Coal Chemicals . . .

Coal Chemical Prices, Page 154

Pittsburgh—U. S. Steel subsidiaries advanced pure benzol 3 cents to 25 cents per gallon in carlots at all producing points, effective June 1. Prices for one degree toluol and industrial xylol were increased one cent per gallon on sale date, with one exception of Geneva, Utah. Other interests have followed this price action. Price increases are in sharp contrast to 25 per cent reduction by producers of ammonia sulphate last month. Ris-

ing production costs and good demand outlook are principal factors behind the advances.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

3100 tons, apartment, 18th street and Walnut, Philadelphia, to Bethlehem Steel Co.

2200 tons, transmission towers for Bonneville Power Administration to Bethlehem Pacific Coast Steel Corp., Seattle.

1325 tons, state highway bridges, Berkley-Raynham-Taunton, Mass., to Bethlehem Steel Co., through Campanella & Cardi Co., Cranston, R. I., general contractor.

1000 tons, municipal airport buildings, Philadelphia, to Bethlehem Steel Co.

660 tons, state highway bridges, Reading-Wakefield, Mass., to Groisser & Shalger Iron Works, Somerville, Mass., through A. V. Taurasi Co., that city, general contractor.

450 tons, Washington state Nooksack river bridge, to Consolidated Western Steel Corp., Seattle; general contract to Guy F. Atkinson Co., Seattle, low $731,151.

400 tons, plant addition, Fairbanks, Morse & Co., Beloit, Wis., to Mississippi Valley Structural Steel Co., through Stone & Webster Engineering Corp., Boston, general contractor-engineer.

200 tons, warehouse, Fred Whittaker Co., to Bethlehem Fabricators Inc., Bethlehem, Pa.

160 tons, plant addition, Armstrong Cork Co., South Braintree, Mass., to Bethlehem Steel Co.

STRUCTURAL STEEL PENDING

1450 tons, contract 33, sec. 3, New Jersey Turnpike, between Woodbury Heights and Hartford; bids June 15.

1130 tons, contract 35, New Jersey Turnpike substructures and superstructures of the Belleville Turnpike overpass, south of the Hackensack river and Lackawanna Railroad overpass, north of Laurel Hill; bids June 15; also required are 37,800 ft of steel piles and 44 tons of wrought iron blast plates.

1000 tons, bakery and warehouse, American Stores, Philadelphia; bids June 14.

1000 tons, Rittenhouse Square apartments, Philadelphia; bids closed June 2.

600 tons, bridge, Reading Co., Reading, Pa.; bids closed May 26.

600 tons, addition, turbine laboratory, Bureau of Yards & Docks, Trenton, N. J.; bids June 7.

500 tons, warehouse, Sears-Roebuck Co., Boston; bids June 8.

400 tons, contract 7, Delaware Memorial bridge, Wilmington, Del.; bids June 15.

350 tons, bridges, Charles river embankment highway, Boston; bids June 8, that city.

300 tons, factory, Newman & Co., Philadelphia; bids closed May 25.

100 tons, state highway, Greenfield, Mass.; bids June 13, Boston.

95 tons, state bridge, Cameron county, Pennsylvania; bids June 16.

Unstated, steel cables, 261-foot suspension King county bridge; R. W. Austin, Seattle, low $62,245.

Unstated, Station P/57, Morrison-Knudsen Co., Seattle, low $787,826 to U. S. Engineer, Seattle.

REINFORCING BARS . . .

REINFORCING BARS PLACED

2100 tons, research hospital, Chicago, Veterans Administration, to United States Steel Supply Co., Chicago.

280 tons, Washington state Nooksack bridge, to Northwest Steel Rolling Mills, Inc., Seattle; Guy F. Atkinson Co., Seattle, general contractor.

115 tons, parish house and other buildings, First Methodist Church, Seattle, to Bethlehem Pacific Coast Steel Corp., Seattle.

REINFORCING BARS PENDING

1620 tons, anchorage tops and concrete deck, Delaware Memorial bridge, near Wilmington, Del.; bids June 15, State Highway Department, Wilmington.

1000 tons, laterals construction Columbia Basin project; bids to Bureau of Reclamation.

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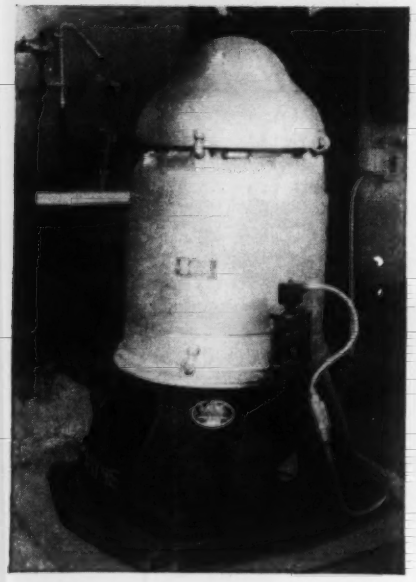

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Ephrata, Wash., June 22.

710 tons, contract 33, New Jersey Turnpike work, between Woodbury Heights and Hartford; bids June 15.

236 tons, contract 35, New Jersey Turnpike, near Laurel Hill; bids June 15.

100 tons, also 35 tons shapes, Green river bridge, King county, Washington; Tower Construction Co., Seattle, low $106,611.

PLATES . . .

PLATES PLACED

3800 tons, barges, Union Barge Line Corp., Pittsburgh, to Dravo Corp., Pittsburgh.

1000 tons disposal tanks, Hanford project, Washington state, reported to Gilmore Steel Co., San Francisco; general contract to Fred J. Early Jr. Co., San Francisco, low $1,567,126.

150 tons, 500,000-gal elevated steel tank, Palatine Hill water district, Portland, Oreg., to American Pipe & Construction Co., Portland.

100 tons, water tanks at Bellingham, Wash., and Progress, Oreg., to Chicago Bridge & Iron Co., Seattle.

100 tons, water tanks for Coulee Dam, Wash., to Consolidated Western Steel Corp., Seattle.

PIPE . . .

CAST IRON PIPE PLACED

350 tons, 16 to 8 in., local improvement project, Yakima, Wash., to H. G. Purcell, Seattle, for U. S. Pipe & Foundry Co., Burlington, N. J.

350 tons, two local improvement projects, Tacoma, Wash., to Pacific States Cast Iron Pipe Co., Portland, Oreg.

CAST IRON PIPE PENDING

250 tons, 11,400 ft 12 to 6 in. mains, or alternatives; bids to Moses Lake, Wash., June 6.

Unstated, Palatine Hill water district, Portland, Oreg.; general contract to P. S. Lord Co., Portland.

RAILS, CARS . . .

RAILROAD CARS PLACED

Green Bay & Western, 200 fifty-ton steel box cars, to be leased through Equitable Life Assurance Society and to be built by Pullman-Standard Car Mfg. Co., Chicago.

RAILROAD CARS PENDING

Southern Railways, 250 seventy-ton covered hopper cars; bids asked.

Gulf Mobile & Ohio, 200 fifty-ton automobile cars; bids asked.

Akron, Canton & Youngstown, 150 fifty-ton box cars; pending.

FERROALLOYS

(*Continued from Page* 155)

Foundry Ferrochrome: (Cr 62-66%, C 5-7%). Contract, c.l., 8MxD, bulk, 22.0c per lb of contained Cr, c.l., packed 22.9c, ton 24.25c, less ton 26.0c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-72%). Contract, carload, lump, bulk, max. 0.03% C 31.85c per lb of contained Cr, 0.04% C 29.75c, 0.06% C 28.75c, 0.10% C 28.25c-28.5c, 0.15% C 28.0c, 0.20% C 27.75c, 0.50% C 27.5c, 1% C 27.25c, 1.50% C 27.1c, 2% C 27.0c. Carload packed add 1.1c, ton lot add 2.2c, less ton add 3.9c. Delivered. Spot, add 0.25c.

"SM" Low-Carbon Ferrochrome: (Cr 62-66%, Si 4-6%, Mn 4-6%, C 0.75-1.25% max.). Contract, carload, lump, bulk 27.75c per lb of contained chromium, carload, packed 28.85c, ton lots 30.05c, less ton 31.85c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome, Nitrogen Bearing: Add 5c to 0.10% C low-carbon ferrochrome prices for approx. 0.75% N. Add 5c for each 0.25% of N above 0.75%.

Low-Carbon Ferrochrome Silicon: (Cr 34-41%, Si 42-49%, C 0.05% max.) Contract, carload, lump, 4" x down and 2" x down, bulk, 20.50c per lb of contained chromium plus 11.30c per pound of contained silicon; 1" x down, bulk 20.65c per pound of contained chromium plus 11.50c per pound of contained silicon. F.o.b. plant; freight allowed to destination.

Chromium Metal: (Min. 97% Cr and 1% Fe). Contract, carload, 1" x D; packed, max 0.50% C grade, $1.03 per lb of contained chromium, ton lot $1.05, less ton $1.07. Delivered. Spot, add 5c.

Silicon Alloys

25-30% Ferrosilicon: Contract, carload, lump, bulk, 17.00c per lb of contained Si; packed 18.40c; ton lot 19.50c, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 11.3c per lb of contained Si, carload packed 12.9c, ton lot 14.35c, less ton 16c. Delivered. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max.) Add 1.3c to 50% ferrosilicon prices.

75% Ferrosilicon: Contract, carload, lump, bulk, 13.5c per lb of contained Si, carload packed 14.8c, ton lot 15.95c, less ton 17.2c. Delivered. Spot, add 0.8c.

80-90% Ferrosilicon: Contract, carload, lump, bulk, 14.65-15.0c per lb of contained Si, carload packed 15.9c, ton lot 16.9c, less ton 18.05c. Delivered. Spot, add 0.25c.

Low-Aluminum 85% Ferrosilicon: (Al 0.50% max.). Add 0.7c to 85% ferrosilicon prices.

90-95% Ferrosilicon: Contract, carload, lump, bulk, 16.5c per lb of contained Si, carload packed 17.7c, ton lot 18.65c, less ton 19.7c. Delivered. Spot, add 0.25c.

Low-Aluminum 90-95% Ferrosilicon: (Al 0.50% max.). Add 0.7c to above 90-95% ferrosilicon prices.

Silicon Metal: (Min. 97% Si and 1% max. Fe). C.l. lump, bulk, regular 19.0c per lb of Si, c.l. packed 20.2c, ton lot 21.1c, less ton 22.1c. Add 1.5c for max. 0.10% calcium grade. Deduct 0.4c for max. 2% Fe grade analyzing min. 96% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe) Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 7.65c per lb of alloy, ton lots packed 9.05c, 200 to 1999 lb 9.40c, smaller lots 9.90c. Delivered. Spot up 0.5c.

Briquetted Alloys

Chromium Briquets: (Weighing approx. 3⅝ lb each and containing exactly 2 lb of Cr). Contract, carload, bulk, 13.75c per lb of briquet, carload packed 14.45c, ton lot 15.25c, less ton 16.15c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing exactly 2 lb of Mn). Contract, carload, bulk 10.45c per lb of briquet, c.l. packaged 11.25c, ton lot 12.05c, less ton 12.45c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing exactly 2 lb of Mn and approx. ½ lb of Si). Contract, c.l. bulk 10.30c, per lb of briquet, c.l. packaged 11.1c, ton lot 11.9c, less ton 12.8c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx. 5 lb and containing exactly 2 lb of Si). Contract, carload, bulk 6.15c per lb of briquet, c.l. packed 6.95c, ton lot 7.75c, less ton 8.65c. Delivered. Spot, add 0.25c. (Small size—weighing approx. 2½ lb and containing exactly 1 lb of Si). Carload, bulk 6.30c, c.l. packed 7.10c, ton lots 7.90c, less ton 8.80c. Delivered. Add 0.25c for notching small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each) 95.00c per pound of Mo contained. F.o.b. Langeloth, Pa.

Calcium Alloys

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%.) Contract, carload, lump, bulk 19.25c per lb of alloy, carload packed 20.05c, ton lot 21.55c, less ton 22.55c. Delivered. Spot add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.50-3%). Contract, carload, lump, bulk 17.9c per lb of alloy, carload packed 19.1c, ton lot 21.0c, less ton 22.5c. Delivered. Spot add 0.25c.

Titanium Alloys

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max., Si 4% max., C 0.10% max.) Contract, ton lots 2" x D, $1.40 per lb of contained Ti; less ton $1.45. (Ti 38-43%, Al 8% max., Si 4% max., C 0.10% max.) Ton lot $1.28, less ton $1.35, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot, add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract $160 per net ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 3-4.5%.) Contract, $175 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

UNIVERSITY OF MICHIGAN LIBRARIES

Vanadium Alloys

Ferrovanadium: Open-hearth Grade (Va 35-55%, Si 8-12% max., C 3-3.5% max.). Contract, any quantity, $2.90 per lb of contained Va. Delivered. Spot, add 10c. **Crucible-Special Grades** (Va 35-55%, Si 2-3.5% max., C 0.5-1% max.), $3. **Primos and High Speed Grades** (Va 35-55%, Si 1.50% max., C 0.20% max.) $3.10.

Grainal: Vanadium Grainal No. 1, 93c; No. 6 63c; No. 79, 45c, freight allowed.

Vanadium Oxide: Contract, less carload lots $1.20 per lb contained V_2O_5, freight allowed. Spot, add 5c.

Tungsten Alloys

Ferrotungsten: (70-80%). Contract, 10,000 lb W or more, $2.25 per lb of contained W; 2000 lb W to 10,000 lb W, $2.35; less than 2000 lb W, $2.47. Spot, add 2c.

Tungsten Powder: (W 98.8% min.). Contract or spot, 1000 lb or more, $2.90 per lb of contained W; less than 1000 lb W, $3.

Zirconium Alloys

12-15% Zirconium Alloys: (Zr 12-15%, Si 39-43%, Fe 40-45%, C 0.20% max.). Contract, c.l., lump, bulk 6.6c per lb of alloy, c.l. packed 7.35c, ton lot 8.1c, less ton 8.95c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max.). Contract carload, lump, packed 20.25c per lb of alloy ton lot 21c, less ton 22.25c. Freight allowed. Spot, add 0.25c.

Boron Alloys

Ferroboron: (B 17.50% min., Si 1.50% max., Al 0.50% max., C 0.50% max.). Contract, 190 lb or more, 1" x D, $1.20 per lb of alloy. Less than 100 lb $1.30. Delivered. Spot, add 5c. F.o.b. Washington, Pa., prices 100 lb and over are as follows: Grade A (10-14% B) 75c per pound; Grade B (14-18% B) $1.20; Grade C (19% min. B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si), $4.25 per lb contained B, f.o.b. Philo, O., with freight not to exceed railroad freight allowed to destination.

Bortam: (B 1.5-1.9%). Ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: (B 1 to 2%) contract, lump carloads 9.50c per lb, f.o.b. Suspension Bridge, N. Y., frt allowed same as high-carbon ferrotitanium.

Other Ferroalloys

Ferrocolumbium: (Cb 50-60%, Si 8% max., C 0.4% max.). Contract, ton lot, 2" x D, $3.50 per lb of contained Cb, less ton $3.55. Delivered. Spot, add 10c.

Ferrotantalum—Columbium: (Cb 40% approx., Ta 20% approx., and Cb and Ta 60% min, C 0.30 max.) ton lots, 2" x D, $2.67 per lb of contained Cb plus Ta, delivered; less ton lots $2.72.

CMSZ Mixes: (No. 4—Cr 45-49%, Mn 4-6%, Si 18-21%, Zr 1.25-1.75%, C 3-4.5%; No. 5—Cr 50-56%, Mn 4-6%, Si 13.50-16.0%, Zr 0.75-1.25%, C 3.50-5%). 12 M x D, carload packed 19.0c per lb of material, ton lot 19.75c, less ton 21.0c. Delivered.

Silcaz Alloy: (Si 35-40%, Ca 9-11%, Al 6-8%, Zr 3-5%, Ti 9-11%, B 0.55-0.75%). Carload packed, 1" x D, 43c per lb of alloy, ton lot 45c, less ton 47c. Delivered.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx.). Contract, carload, packed, ½" x 12 M, 16.5c per lb of alloy, ton lots 17.50c, less ton 18.5c. Delivered, Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 17.00c per lb of alloy; ton lots 18.00c; less ton lots 19.50c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed, 14.25c per lb of alloy; ton lots 15.75c; less ton lots 17.00c. f.o.b., Niagara Falls, N. Y.; freight allowed to St. Louis.

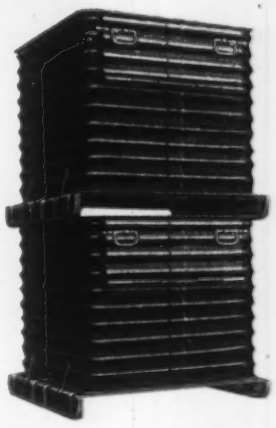
Simanal: (Approx. 20% each Si, Mn, Al). Lump, bulk, carload 11.00c. Ton lots, bulk 11.50c, packed 11.75c. Less ton lots, packed 12.25c per lb of alloy, f.o.b. Philo, O., with freight not to exceed railroad freight allowed to destination.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $3 for each 1% of P above or below the base); carloads, f.o.b. seller's works, Mt. Pleasant, or Siglo, Tenn., $65 per gross ton.

Ferromolybdenum: (55-75%). Per lb, contained Mo, f.o.b. Langeloth and Washington, Pa., furnace, any quantity $1.13.

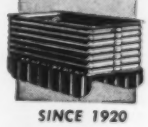
Technical Molybdic-Oxide: Per lb, contained Mo., f.o.b. Langeloth and Washington, Pa., packed in bags containing 20 lb of molybdenum, 95.00c.

ANOTHER TIME-SAVING COST-CUTTING ALL-STEEL MATERIALS HANDLING BOX DESIGNED AND BUILT BY POWELL



Materials handling jobs require individual attention. Powell specializes in special as well as standardized equipment. The pictured Hinged End Door Box Platform was recently delivered to a customer who wanted a stacking box that was easy to work out of even when stacked. The box had to be easy to get to with fork lift trucks yet—to facilitate tiering—have a minimum fork space. Powell met every requirement satisfactorily.

POWELL
PRESSED STEEL



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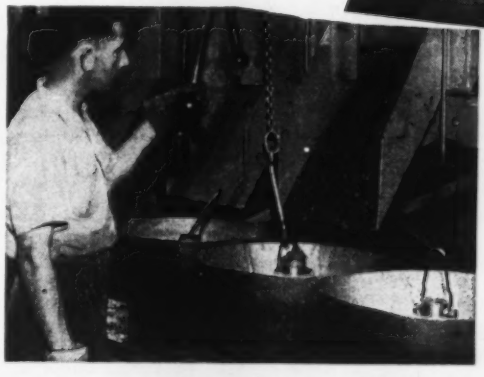
Dept. 36 Hubbard, Ohio
(In Greater Youngstown)

Powell designs and builds all kinds of materials handling containers *from any metal.* If you are not certain you are handling your products economically—call in Powell—*originator of cold formed steel materials handling* equipment.

Bulletin 700 indicates Powell versatility in creating special equipment. Write for it.

CUTTING-OIL RECOVERY can pay for an AMERICAN TURNINGS CRUSHER



Reducing long, curly turnings of steel, alloys, brass, aluminum etc. to uniform chips—with an American Turnings Crusher—*increases cutting oil reclamation* to 30-50 gallons per ton!

The *higher scrap value* of short shovel chips . . . and the savings in storage and handling too—these are additional reasons why Americans buy themselves . . . again and again!

Segregated turnings are reduced to uniform chips by an American Shredder Ring Crusher for **highest cutting oil recovery** at the Crown Cork and Seal Co., Baltimore.

Write for informative bulletin—Reducing your Turnings with an American

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Originators and Manufacturers of Ring Crushers and Pulverizers
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CUT WELDING COSTS 26.3%* with Norelco CONTACT WELDING ELECTRODES

● With this entirely *new type* of rod, welding speeds are increased an average of 45%. Welding is made much easier by touch-welding in all positions; and quality uniformly improved through less distortion, undercutting, and better control.

Available in two types: Contact 18 (in conformance with AWS E6013 class) for fast all-position general-purpose welding, and Contact 20 (AWS 6020 class) for extremely fast production welding in horizontal and downhand positions. Both AC or DC.

Norelco CONTACT WELDING ELECTRODES

*For full details of actual production results, technical information and prices write:

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Metalworking Briefs

CONSTRUCTION, ENTERPRISE ORGANIZATIONAL CHANGES

Alabama

Tennessee Valley Authority has construction under way for the $35 million Widows Creek steam plant, Bridgeport, Ala. General Electric Co., Schenectady, N. Y., has contract for generators; Babcock & Wilcox Co., New York, for boilers.

California

H. S. Watson Co., San Francisco, is planning erection of a plant in San Leandro, Calif. Cost of the expansion, including land and equipment, will be about $90,000. The company distributes truck auxiliary transmissions that are manufactured by **Spicer Mfg. Co.,** Toledo, O.

Delaware

National Vulcanized Fibre Co., Wilmington, Del., was granted a permit for construction of a factory building to cost $110,000.

Illinois

William P. Burke, formerly assistant manager of sales, Sheet & Strip Division, **Inland Steel Co.,** and Bernhard Gordon, president, **Gordon Steel Co.,** organized a new steel warehousing organization, the **Gordon-Burke Steel Co.** Offices and warehouse are at 2910 Carroll Ave., Chicago.

New York

Universal Atlas Cement Co., subsidiary of **U. S. Steel,** leased for a long term of years two floors in the new office building at 100 Park Ave. for its executive and general offices. The company's offices have been located in the Chrysler Bldg. for the last 20 years.

Kansas

Fairbanks, Morse & Co., Chicago, is negotiating for acquisition of 40 acres of land from Atchison, Topeka and Santa Fe Railway as a site for a $5 million scale plant.

Kentucky

General Shoe Corp., Nashville, Tenn., will construct a new plant on the Hustonville road, near Danville, Ky. Nelson Carmichael, assistant vice president, has charge of plant development.

Louisiana

Ethyl Corp., Baton Rouge, La., has received a low bid of $672,000 from **James Stewart & Co. Inc.,** Dallas, for a central building and storage unit. Albert Kahn & Associates, Detroit, are the architects. The company also received a low bid of $203,419 from **R. P. Farnsworth & Co.,** Baton Rouge, for a change house and office building. Bodman & Murrell, that city, are the architects.

Michigan

C. E. Johansson Gage Co., division of **Swedish Gage Co.,** 8900 Alpine Ave., Detroit 4, was appointed distributor in United States and Canada of Johansson gage blocks and accessories and other products manufactured by the **Aktiebolaget C. E. Johansson Co.,** Eskilstuna, Sweden.

New Jersey

Tagliabue Instruments Division, **Weston Electrical Instrument Corp.,** appointed these district sales representatives, who also are handling the Weston line: C. L. Huffman, **Russell F. Clark Co.,** Pittsburgh; C. W. Stafford, **C. B. Fall Co.,** St. Louis; E. F. Schimbor, Herman E. Held, San Francisco; R. C. Staub, **Beedle Equipment Co.,** Cincinnati; G. O. Miller, **Schiefer Electric Co. Inc.,** Syracuse; T. J. Cunerty, **Powerlite Devices Ltd.,** Toronto; **A. R. Hough Co.,** Knoxville, Tenn.; Edward S. Sievers, Los Angeles; **T. S. Cawthorne Co.,** Detroit; **Eicher & Co.,** Seattle; **Ward Engineering Co. Inc.,** Orlando and Jacksonville, Fla.; W. J. Keller, New Orleans; W. H. Dittman, **Cowperthwait & Brodhead,** Boston. In the Colorado territory, **Peterson Co.,** Denver, handles sales of chemical and industrial thermometers, hydrometers and moisture meters; while **Burson Sales Inc.,** Denver, handles Celectray pyrometers and the mechanical line of Tag temperature and pressure indicating, recording and controlling instruments and dial indicating thermometers.

New York

Portsmouth Division, **Detroit Steel Corp.,** Detroit, moved its New York office from 500 Fifth Ave. to the corporation's New York district office at 250 W. 57th St. E. P. McPhelin, formerly manager of Portsmouth's New York office, is now district manager of sales, wire and wire products, in the corporation's Cincinnati district office, Carew Tower, Cincinnati.

Indiana

Universal Tool & Stamping Co., Spencerville, Ind., and **Mayer Tool & Die Co.,** Fort Wayne, Ind., are combining their plants and moving them to Butler, Ind., as soon as a $65,000 building can be erected. The Spencerville firm produces automobile jacks while the Fort Wayne company specializes in rebuilding and erecting machine tools and manufacturing dies which are used for production work in machine shops.

North Carolina

Directors of **Farmers Cooperative Exchange,** M. G. Mann, Raleigh, N. C., general manager, approved plans for additions to its feed mill at Statesville, N. C. Estimated cost is $200,000.

Ohio

Cleveland Electric Illuminating Co. plans to spend more than $125 million to expand its power capacity another 50 per cent by 1955. A giant new power plant will be built in Eastlake, O., 15 miles east of Cleveland, at a cost of more than $100 million before it is completed.

Ohio

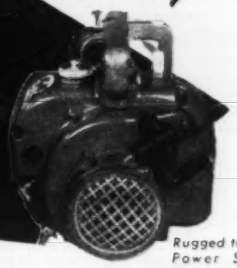
Akron Brass Mfg. Co. is moving to its Wooster, O., plant a large amount of equipment from a company-owned subsidiary, **Fog-Nozzle International,** Los Angeles. Plant in the latter city is being closed down; in the future all of the items previously made there will be manufactured at the Wooster plant.

Ohio

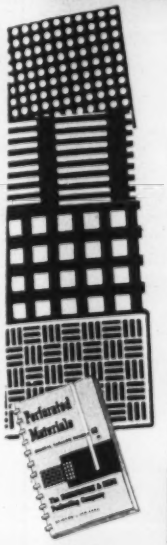
A. O. Smith Corp., Milwaukee, purchaser of Whirl-A-Way Motors Inc., Tipp City, O., will spend more than $300,000 for a plant addition on the Kilgore property, Tipp City. D. L. Mills, former president of Whirl-A-Way, will remain with the Smith cor-

Practical Beauty

H&K PERFORATED METAL



Rugged tools like this Power Saw attain maximum ventilation and efficiency with H & K Perforated Screen.



It is simple to have added eye appeal, plus strength, safety, ventilation and visibility in your product — use H & K Perforated Materials. They meet the highest standards for precision, efficiency, and distinctive functional beauty. H & K can perforate practically any metal or material in coil, sheet, or plate form. H & K Patterns are available in a wide range of industrial sizes and shapes, and standard or special ornamental designs. Where required, hole dimension tolerances of ±.0005" maintained. Perforations range from .020" round to 9" diameter, and slots from .006" wide. Also complete facilities for rolling, embossing, forming, blanking, welding and fabricating.

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No. 40 — Product of Steam Specialty Division Strong, Carlisle & Hammond Company Cleveland 13, Ohio

Snaps the Trap on

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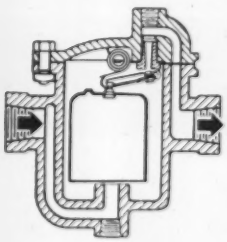
- **Heat Loss**
- **Time Loss**

CHACE Thermostatic Bimetal helps actuate this Strong Steam Trap, designed to: (1) Automatically remove condensate without loss of steam (2) Release air and non-condensable gases to prevent air binding. Unit heaters, pressers, small kettles and other units distant from boilers and shut off nightly require the quick air and condensate removal afforded by this trap.



When cold, the bimetal coil holds bucket down and valve open for discharge of air and water; as steam reaches trap, coil expands, allowing bucket to control discharge valve. Chace No. 2100 is specified for the coil because of its high torque rate and excellent corrosion resistance. It is one of 30 bimetals which offer designers an unlimited selection of physical properties, depending on reaction desired and operating conditions to be encountered. All can be furnished in strips, coils or fabricated elements.

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